

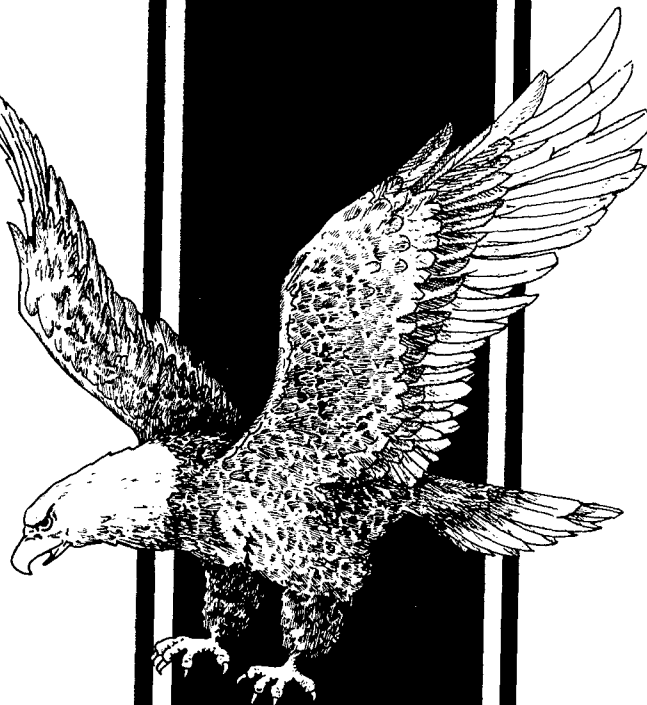
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# USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

FINAL

SITE SPECIFIC SAFETY AND HEALTH PLAN FOR  
FORT GEORGE G. MEADE  
BASE CLOSURE PARCEL SITE INSPECTION STUDY



Prepared for:

U.S Army Toxic and Hazardous Materials Agency  
ATTN: AMXTH-IR-D (Edwards)  
Building E 4435 Aberdeen Proving Grounds  
Edgewood, Maryland 21010-5401

Prepared by:

EA Mid-Atlantic Regional Operations  
EA Engineering, Science, and Technology, Inc.

Distribution Unlimited,  
approved for Public Release

April 1990

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## 1. INTRODUCTION

Personnel involved in field investigations and remediation at sites where hazardous wastes may be present are potentially exposed to a variety of hazards, including:

- . Inhalation of toxic airborne contaminants.
- . Skin contact with contaminated soil and water.
- . Presence of flammable/combustible vapors.
- . Oxygen-deficient atmospheres.
- . Heat stress due to protective clothing and environmental conditions.
- . Physical hazards inherent to field operations (e.g., working near heavy equipment or at remote locations).

Adequate planning is needed prior to performing work at these sites to minimize the risk of employee injury or illness.

Note that certain items included in this site safety and health plan have been deemed necessary over the course of the technical plan development; however, the current budget estimates do not reflect additional costs associated with these items. These additional items include:

- . Section 3.3.5 states that Unexploded Ordnance (UXO) clearance will be given to a depth of 5 feet prior to drilling, and to 20 ft once drilling operations begin.
- . A list of areas which must be cleared for UXO prior to the beginning of work operations is presented in Section 3.3.5 of the SSSHP.

Any suspect UXO areas added by a change in the scope of work will have to be added to this list and receive UXO clearance prior to work startup.

- . If the ecological survey includes surface water/sediment sampling, soil sampling, or electrofishing, then all suspect UXO areas where these operations occur must first be cleared for UXO.
- . A buffer zone of 100 yards surrounding suspect mustard areas, in which no invasive operations may occur, will be established by the EA SSHS.

#### 1.1 PURPOSE

The purpose of this Site Specific Safety and Health Plan (SSSHP) is to provide personnel protection standards and mandatory safety practices, procedures, and contingencies while performing the tasks outlined in the scope of work. This SSSHP addresses the following regulations and guidance:

- . Occupational Safety and Health Administration (OSHA) Standards for General Industry, 29 CFR 1910 (especially 29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response")
- . OSHA Standards for Construction Industry, 29 CFR 1926
- . National Institute of Occupational Safety and Health (NIOSH), OSHA, U.S. Environmental Protection Agency (EPA), and U.S. Coast Guard "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985.



## 1.2 RESPONSIBILITIES

The chain of command for safety and health-related issues during investigative activities at Fort George G. Meade is delineated below.

### 1.2.1 All EA Personnel

All EA and subcontractor personnel must follow the requirements of this SSSHP. Any unsafe conditions must be promptly reported to the Site Safety and Health Supervisor.

### 1.2.2 Project Manager

The responsibilities of the Project Manager include:

- . Coordinating with the USATHAMA designated Contracting Officer's Representative (COR).
- . Providing overall supervisory control for all health and safety protocols in effect for the project.
- . Informing the Corporate Safety and Health Officer of any changes in the Scope of Work.
- . Coordinating all EA subcontractors, ensuring that they are informed and agree with all requirements of this SSSHP.
- . Reviewing and approving changes/amendments to this SSSHP.

### 1.2.3 Corporate Safety and Health Officer (CSHO)

The CSHO's responsibilities include:

- . Reviewing and confirming any changes in personal protective clothing or respiratory protection requirements.

- . Reviewing all health and safety documentation.
- . Evaluating onsite air monitoring results.
- . Providing technical support to the SSHS, particularly in the modification of site health and safety requirements or work plans.
- . Establishing heat stress prevention procedures and performing periodic program reviews.

#### 1.2.4 Site Safety and Health Supervisor (SSHS)

The SSHS will be onsite at all times throughout the project and will be responsible for daily compliance with site safety and health requirements. Responsibilities include:

- . Stopping work when unacceptable health or safety risks exist.
- . Providing a health and safety briefing to all site visitors.
- . Conducting any necessary monitoring, including collection of air samples and heat stress monitoring.
- . Establishing and ensuring compliance with site control areas and procedures.
- . Supervising decontamination to ensure complete decontamination of all personnel, tools, and equipment.

- . Supervising the distribution, use, maintenance, and disposal of personal protective clothing and equipment.
- . Preparing any incident reports required.
- . Preparing Daily Safety and Health Activity Reports (Attachment G)

### 1.3 WORKSCOPE

The purpose of this site investigation is to provide a database and interpretive report which will define the onsite environmental conditions and recommend a remediation program. The workscope includes:

- . Soil Vapor Containment Assessment (SVCA) Survey.  
Note: The exact locations for this survey are presently unknown, but will include:
  - (1) leaking underground storage tanks (USTs), including the large UST field;
  - (2) USTs located in the contonment area bordering the 9,000-acre parcel of land;
  - (3) two fire training areas, one located at the present helicopter hangar at Tipton and the second located west of airfield road, between the airfield and the railroad tracks;
  - (4) four inactive landfills located onsite;
  - (5) DPDO Salvage Yard.

- . Geophysical Surveys:

Will be conducted at each of the four inactive landfills to ascertain the edges of the fill.

- . Surface Water/Sediment Sampling:

Surface water/sediment samples will be collected from Soldier's Lake. Surface water/sediments will be collected in the vicinity of the Sewage Treatment Plant, in the Little Patuxent River.

- . Monitoring Well Installation/Ground-Water Sampling:

Shallow monitoring wells (30 ft) will be installed and sampled onsite.

Previously installed wells at the active landfill will be sampled.

- . Soils Sampling:

Soil samples will be collected from the two fire training pits. Soil samples will be collected from the various monitoring well installations at UST sites and the Ordnance Disposal Area.

- . Asbestos Survey: Will be conducted to assess the extent and condition of asbestos-containing material in various Fort Meade buildings and facilities.

- . Ecological Survey.

#### 1.4 KEY PERSONNEL

The following personnel have been assigned to specific work efforts in this project:

Program Manager: C.R. Flynn, Ph.D.

Project Principal: K.W. Kilmer

Project Director: J. Zarzycki

Quality Assurance Officer: R.L. Cypher

Corporate Safety and Health Officer: J.V. Breysse

Project Manager: S.A. Brown

Site Safety and Health Supervisor: M.V. Sharpe or B.Kelly (Drilling),  
V. Williams (SVCA)

Site Manager: M. Romanak (Geophysics), J. Murtaugh (Drilling),  
V. Williams (SVCA)

Subcontractors: Hardin Huber, Inc.

UXB International, Inc.

## 2. SITE DESCRIPTION

Fort George G. Meade is a nationally prominent administrative and training center located halfway between Washington, D.C., and Baltimore, Maryland, in Anne Arundel County, Maryland (Figure 2-1).

The environmentally significant operations associated with the Fort Meade site include sanitary landfills, training and range areas, underground storage tanks, ordnance demolition and open-burning areas, ammunition supply points, a reported mustard gas burial site, and a storm drainage system.

Based on a review of available information about Fort Meade and observations of Argonne National Laboratory investigations, historical and current practices at the Fort Meade site that may pose a threat to human health and the environment are as follows:

- . Waste petroleum, oil, solvents, and other lubricant products; pesticides; heavy metals; polynuclear aromatic hydrocarbons (aerosols); and potentially other types of hazardous wastes are reported to have been buried in both the active and formerly used landfills at the Fort Meade site. Leachate from these landfills have contaminated local ground water.
- . Unexploded ordnance (UXO) and chemical agents on the surface and beneath the training and range areas pose a potential threat to health and safety because of the risk of inherent explosions. Additionally, the residues of ordnance detonated in demolition and open-burning areas may break down over time and release contaminants to soils and ground water.

- . Several underground storage tanks (USTs) have failed recent integrity tests, indicating leakage of petroleum products to soils and possibly to ground water.
- . Discharges from the National Security Agency (NSA) have been known to contain excessive quantities of heavy metals and solvents. Apparently these releases have been identified as a possible cause of problems associated with Fort Meade's Sewage Treatment Plant No. 2. The effluent from this plant could potentially contaminate surface water and sediments of the Little Patuxent River.

Seven landfills and disposal areas are known to exist at the Fort Meade site, with no documentation as to the volume or content or wastes present in each given landfill. Over the past several decades, all wastes, including toxic and hazardous wastes, generated by Fort Meade activities were reported to have been disposed of onsite. Organic compounds and heavy metals have been detected in the surface water and ground water at the active landfill.

Asbestos is known to be present in various quantities and locations in buildings of the Tipton Army Airfield. An ongoing asbestos survey and removal program is currently in place. According to installation personnel, a large amount of asbestos-containing material (ACM), including asbestos siding, roofing, and insulation that has been removed because of demolition activities over the years, has been disposed of in onsite landfills.

### 3. HAZARD ANALYSIS

This section assesses the chemical and physical hazards that are known to exist at the site and those that may be created by the investigation efforts.

#### 3.1 HAZARDOUS MATERIALS

In previous studies, analysis of soil, sediment, surface water and ground water samples indicates that numerous hazardous materials are present at the site. The contaminants detected include petroleum hydrocarbons and various volatile organic compounds and heavy metals. Most concentrations were less than 1 mg/kg; however, some samples were several orders of magnitude higher. A list of the substances known or suspected to be present onsite is presented in Table 3-1 along with occupational exposure limits, where established, and signs and symptoms of overexposure.

The work required in this hazardous waste investigation project will potentially expose personnel in the Exclusion Zone and Contamination Reduction Zone, via direct contact with or inhalation of airborne chemicals generated from soils and water, to materials that may contain any or all of these hazardous materials.

##### 3.1.1 Soil Vapor Contamination Assessment (SVCA)

There are little or no data available pertaining to the identity or concentration of contaminants suspected to be onsite at the various UST locations where SVCA will be performed. However, there are substances characteristic of UST sites which, in lieu of data, must be assumed to be present. Among these organic compounds are benzene, ethylbenzene, toluene, and xylene. They, as well as other lesser compounds, may be present at varying locations and concentrations throughout the site. Pure product (depending on the contents of the UST) may also be present.



These contaminants are subsurface and pose no risk to workers via dermal contact and little respiratory hazards as long as workers adhere to safe work practices.

Workers at the fire training areas may encounter significant concentrations of the above listed compounds as well as other waste fuel and petroleum compounds. Due to the nature of the activities performed at the fire training areas (typically the waste products are sprayed or poured onto the surface soils or into pits and ignited) there may be residual waste oils on the surface. Workers performing SVCA in the immediate area where the fires are ignited may dermally contact contaminants and inhale volatilized forms of the same contaminants. The risk of exposure is reduced as the workers move away from the ignition area.

While performing SVCA in the vicinity of the current sanitary landfills, contaminants similar to those listed in Table 3-1 may be encountered. The potential for exposure to these contaminants is low, however, based on the techniques used during SVCA. Adherence to safe work practices should provide adequate protection against any potential hazards associated with dermal or contact inhalation.

#### 3.1.2 Geophysical Surveys

Geophysical surveys are to be performed at the four former landfills in order to ascertain the borders of the fill area. It is not anticipated that such surface operations will expose site workers to hazardous substances which may be present onsite.

#### 3.1.3 Surface Water/Sediment Sampling

Surface water/sediment samples will be collected from Soldier's Lake. It is not anticipated that contaminants will exist in concentrations that may pose a risk to the health of the workers. However, there are no data

available to corroborate this position. Therefore appropriate precautions shall be taken while collecting samples to prevent direct contact with potentially contaminated water or sediments.

#### 3.1.4 Monitoring Well Installation/Ground-Water Sampling

Any planned monitoring well installation operation at Fort Meade may involve the potential for exposure to hazardous substances via dermal contact or inhalation. In most cases, contaminants suspected to be present onsite are limited to volatile organic compounds and waste oils. However, at Site 3, along the southern border of the former landfill, mustard, a military chemical weapon which causes severe delayed blistering of skin and lung tissues, is reported to have been unearthed in previous construction-related activities. No monitoring wells may be installed in area where canisters of mustard gas are suspected. A buffer zone of at least 100 yards, as determined by EA of UXB geophysical surveys, surrounding these suspect areas must be maintained. No drilling operations may occur in this buffer zone.

The recommended personal protective equipment (Section 6) should provide adequate protection against dermal and respiratory contamination. A specific monitoring plan (described in Section 7) is required to determine whether or not protection levels continue to be adequate. Special procedures will be initiated to monitor for the presence of chemical agents.

The UXO team will perform M 18 chemical monitoring for unknowns during drilling operations. According to definitions discussed in the Chemical Safety Program, Publication AR-50, chemical agents are defined as any chemical compounds used in military operations to kill, seriously injure, or incapacitate persons through their chemical properties. The UXO team will monitor to ensure personnel protective equipment requirements are sufficient.

Items discovered by the UXO team that are known or believed to contain chemical agents will not be recovered by the UXO team. The UXO team will not perform any explosive ordnance disposal, render safe, or dispose of ordnance items known or believed to contain chemical agents. Emergency response procedures as outlined in Section 10 will be initiated immediately if any suspect chemical agents are encountered. The USATHAMA Safety Officer will coordinate with the U.S. Army Technical Escort Unit and their higher headquarters.

The UXO Contractor will provide interim security for any known or suspect chemical agent munitions. This security should be maintained until government control of the items is assumed.

Mustard is hydrolyzed readily by water to form hydrogen chloride and thiodiglycol. It is not anticipated that mustard by-products will be encountered during ground-water sampling operations. However, exposure to organic compounds via inhalation or dermal contact may be possible.

#### 3.1.5 Soil Sampling

Soil samples will be collected in the vicinity of the fire training area. Workers may encounter the potential for contact with volatile organic compounds, waste oil and greases, as well as waste fuels that were used as fuel for the fire training area. There are no data available to determine what the extent of the potential exposure may be; however, since fuels have been burned, significant exposure via inhalation of volatile organic chemicals is not expected. Workers may dermally contact contaminated media and if the training pits are dry, they may inhale wind and activity generated contaminated dust.

Soil in the Ordnance Demo Area is likely to be contaminated with trace levels of various explosive compounds (TNT, RDX, HMX, C-4). It is unlikely that concentrations of these contaminants in the soil will be

great enough to pose an explosion hazard during soil sampling with a hand auger. Nor is it likely, based on the reported site use limitations and restrictions, that concentrations of these contaminants will be great enough to pose a significant risk to worker health or safety. Inhalation of dust may be of concern if the area is dry during sampling activities. Generally, collection of soil samples from the monitoring well sites may involve low level exposure to organic compounds and heavy metals.

#### 3.1.6 Asbestos Survey

Workers performing the asbestos survey should not be subject to contact with any potentially hazardous compounds other than asbestos. Proper use of the required PPE and adherence to sampling protocols will minimize the potential for exposure via inhalation of asbestos fibers.

#### 3.1.7 Ecological Survey

There are no data to indicate the presence or extent of contamination of the base's various surface water and wetlands systems. However, reports indicate that Soldier's Lake may be contaminated with industrial waste (washrack, steam cleaning, and maintenance shop effluent) which has been discharged in the base storm drainage system. The Little Patuxent River may be likewise contaminated. Use of required PPE and adherence to safe work practices and standardized sampling protocols should provide ample protection from chemical contamination while performing water-level investigations.

It is not anticipated that land-based operations will involve potential exposure to hazardous substances via inhalation or dermal contact. No survey activities will be permitted within the buffer area surrounding suspect mustard sites (see Section 3.1.4)

### 3.2 INITIAL REQUIRED LEVELS OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment ensembles will be assigned to protect employees from potential contamination hazards during the various investigative activities at the Fort George G. Meade sites. Level D PPE will be required initially during SVCA work, geophysical surveys, soil boring, well installation, and soil sampling.

Modified Level D ground-water sampling activities, is required initially during surface water/sediment sampling, and drilling activities at selected locations at former landfills 2 and 3. Modified Level D is also required for the ecological survey when the potential for dermal contact with visibly contaminated wet soil or water exists. Otherwise, Level D PPE may be worn for the survey.

Level D PPE will be required during the asbestos survey. Personnel collecting asbestos samples will be required to don a half-facepiece air purifying respirator.

In addition, engineering controls and work practices will be implemented at these sites to reduce and maintain employee exposure at or below the OSHA regulated permissible exposure limits (PELs) or ACGIH threshold limit values (TLVs) for specific hazardous materials.

### 3.3 PHYSICAL HAZARDS

All EA, subcontractor, and other site personnel may be subject not only to the hazards of contaminant exposure, but also to physical dangers posed by site activities. In addition, heat stress due to working in protective clothing may be encountered.

The physical hazards expected to be present at the sites during investigative activities include:

- . Snapping cables, slings, and rope
- . Drilling equipment
- . Moving equipment
- . Sharp objects
- . Open pits or ditches
- . Excessive noise
- . Fire/explosions
- . Buried utility lines
- . Heat stress
- . Biological hazards (ticks)

### 3.3.1 Abatement of Physical Hazards

Most of the physical hazards identified above will be abated through the use of safe work practices and common sense. Some of these hazards, however, require special precautionary procedures which are discussed below.

### 3.3.2 Fire/Explosion

Whenever site work involves disturbance of hydrocarbon contaminated soils the potential for a fire/explosion may be present. The primary sources of flammable gases/vapors are:

- . Methane, a by-product of the decay of organic material
- . Vapors from volatile organic compounds in the soil

During certain operations, periodic monitoring of flammable vapors/gases using a combustible gas indicator/oxygen analyzer will alert site workers to the presence of dangerous concentrations of these contaminants. Air monitoring requirements for combustible gases are delineated in Section 7.

Fire extinguishers will be provided to personnel onsite. All personnel will be trained in their use.

### 3.3.3 Buried Utility Lines

Fort Meade Engineering staff members will be contacted prior to any drilling activity to ascertain the presence and location of underground cables, utility lines, pipes and storage vessels at the proposed sites. Utility maps will be reviewed to determine the presence of any of the above mentioned underground hazards. Drilling locations will also be screened for underground hazards using a pipe and cable locator prior to the commencement of any drilling activity.

### 3.3.4 Heat Stress

All personnel entering the Exclusion Zone should be familiar with the signs and symptoms of heat stress. These include:

- . Heat Exhaustion--Dizziness, light-headedness, slurred speech, rapid pulse, confusion, fainting, fatigue, copious perspiration, cool skin that is sometimes pale and clammy, and nausea.
- . Heat Stroke--Hot, dry, flushed skin; rapid, deep breathing; lack of perspiration; delirium; and coma (in some cases).

Heat stress can be prevented by resting frequently in a shaded area and consuming large quantities of fresh, potable water. If heat exhaustion symptoms are observed, the person will be immediately required to rest in a shaded area and to consume liquids. If symptoms are widespread or observed frequently, an appropriate work/rest regimen will be instituted. This may involve limiting the work period so that after one minute of rest, a person's heart rate (HR) does not exceed 110 beats per minute. The Site Safety and Health Supervisor (SSHS) shall ensure that heat stress monitoring is conducted.

If the HR is higher than 110 beats per minute, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the HR is 110 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent. Resting HR should be determined prior to start of onsite activities. A healthy individual's resting HR is usually 60 to 72 beats per minute.

If symptoms of heat stroke are observed, the victim shall be transported to the nearest medical facility immediately. Workers should not hesitate to seek medical attention if heat stroke is suspected.

#### 3.3.5 Unexploded Ordnance (UXO)

The locations of all operations where UXO is anticipated must be cleared prior to the initiation of work. Sites where UXO screening will need to be performed include:

1. Inactive Landfills

- Landfill #1
- Landfill #2
- Landfill #3
- Clean Fill Dump

2. Ordnance Demolition Area (Range 16)

3. Fire Training Area

4. Surface Water Survey

- Little Patuxent River
- Soldier's Lake
- Sewage Treatment Plant Discharge



5. Underground Storage Tank Sites

Site 1  
2  
3  
4  
5  
6  
7  
8  
9

6. Ecological Survey

All locations for electrofishing operations  
All locations where soil samples may be collected

Access routes to these work areas will be cleared by a UXO surface clearance team. The route will be approximately 15 ft in width from current roads to proposed well location and SVCA locations. The entry route will be cleared with ordnance locators to a depth of 2 ft for equipment access. The UXO team will mark cleared access pathways with a high-visibility boundary marker tape. The UXO team will perform Explosive Ordnance Reconnaissance (EOR) procedures during initial entry and will conduct a hazard assessment of ordnance items found on the surface.

Proposed well locations and SVCA locations will be surface and subsurface cleared for UXO with a radius of clearance dependent upon the drill rig size. The following clearance radii will be applicable for proposed well locations:

1 Ton Drill Rig	30 ft radius
5 Ton Drill Rig	45 ft radius
10 Ton Drill Rig	60 ft radius

Proposed well and SVCA locations will be moved if the UXO clearance team encounters UXO.

Prior to drilling operations, well locations will be geophysically investigated to a depth of 5 ft below surface grade with an ordnance

locator utilized in the well in the advance mode. During drilling, wells will be electronically investigated and certified clear by the UXO team every 5 ft to a depth of 20 ft to ensure well drilling equipment will not encounter UXO.

No UXO operations will be conducted during the hours between sunset to sunrise, or during electric storms or severe weather conditions. Additionally, no UXO operations will be conducted if severe weather conditions are imminent.

Additional details of the UXO screening program are presented in Attachment H.

#### 3.3.6 Drilling/SVCA

During the first day of drilling, a sound level meter will be used to evaluate the potential for exposure of site personnel to excessive levels of noise. If the noise levels are likely to exceed 85 dBA for any portion of the drilling, hearing protection will be required to be worn during this operation.

As stated above, the selection of locations for each monitoring well drilling activity site and SVCA site will take into account buried utility pipes, wires, conduits, and tanks, or other potentially dangerous structures, including UXO and military supplies. Overhead power lines and obstructions will also be surveyed. Prior to raising the mast, the area overhead and surrounding the rig will be checked by the drilling foreman and the SSHS. No drilling will be conducted within 50 ft of an overhead power line or obstruction.

When rotary drilling/sampling, drill rods will not be racked more than 1½ times the height of the mast. During drilling operations and rig setup and takedown, all persons who enter the Exclusion Zone will wear hard hats, safety shoes/boots, and safety glasses/face shields to protect personnel from the physical hazards.

If during drilling there is any indication that underground tanks, drums, or other containers are being encountered, the drilling will be halted immediately and the SSHS notified. Indications that a waste container may have been encountered include (1) change in the speed or momentum of the auger, (2) visual examination of auger cuttings, (3) odor noted in the cuttings, and/or (4) the presence of airborne total volatile organics as measured with a direct-reading instrument.

#### 3.3.7 Sampling

Fixatives will be applied to the samples in the field and the possibility exists for direct contact with potentially hazardous substances; therefore, PPE must be worn as delineated in Section 3.2. Material Safety Data Sheets (MSDS) are provided in Attachment A2 as required by 29 CFR 1910.1200, Hazard Communication.

#### 3.3.8 Asbestos Survey

Asbestos sampling will be conducted by EPA accredited inspectors in a manner which will minimize or eliminate the release of suspect asbestos fibers into the atmosphere. Locations that are to be sampled will be "wet down" with a surfactant solution prior to sampling to prevent an airborne release of fibers. Each sample will be double-bagged to prevent the release of fibers. After sampling, the sample location will be sealed/contained with duct tape. Personal protective equipment will be utilized as detailed in Section 3.2.

#### 3.3.9 Biological Hazards

Biological hazards such as poisonous snakes and disease-bearing ticks may be encountered on the site. To protect against these hazards, onsite workers will wear long-sleeved shirts, long pants, and boots that extend above the ankle or socks pulled over the cuffs of pants. To prevent tick infestation, workers should tuck pant cuffs into boots. Insect repellent may also be applied to the cuff area as an effective deterrent.

Workers should frequently inspect each other's clothing and their own clothing, skin, and hair, for the presence of ticks, as well as thoroughly checking at the end of each work day. If a tick attaches itself to a worker's body, the tick should be removed by gently tugging with tweezers where the mouth parts enter the skin. The tick should not be killed prior to removal.

#### 3.3.10 Electrofishing

The electrofishing operation is performed during ecological assessments in order to capture and identify fish specimens inhabiting the subject body of water. The operations may utilize various methods of introducing an electric charge to the water which stuns the fish and renders them immobile for a period of time sufficient to collect the necessary data. Potential hazards associated with this operation include:

- . Electric shock
- . Drowning
- . Noise from equipment
- . Burns from gasoline-powered electric generators

For operations at Fort George G. Meade, it is anticipated that operations will utilize back-pack shockers for streams and the electrofishing boat for the Little Patuxent River and Soldiers Lake, if the lake is to be included in the survey. Electrofishing will never be performed alone; at least two persons who can quickly break the circuit must be available at all times.

##### 3.3.10.1 Back-Pack Electrofishing

The back-pack shocker is a battery-operated device which delivers a 3 to 6 ampere charge to the surrounding water via hand-held electrodes. The

unit is worn by an insulated worker who then wades through the water, delivering current and netting sample fish at the designated areas. The electrode handles are constructed of a non-conductive material. Other safety features of the apparatus include:

- . Gel-type batteries that will not leak if tipped or overturned
- . "Dead-man" switch that must be activated in order to deliver electrical current
- . Quick-release belts with shoulder harness
- . Bulb switch which breaks the electrical circuit automatically if the operator falls

#### 3.3.10.2 Boat Electrofishing

The electrofishing boat provides adequate flotation for freeboard clearance consistent with equipment, cargo, and passenger weight. The boat is equipped to meet U.S. Coast Guard and State boating regulations. A gasoline-powered generator provides the electrical output which is introduced to the water via conductors. The conductors are extended forward from the boat and are insulated to prevent electrocution of operators. The circuit must immediately be broken if a person falls overboard. Other safety features of the boat include:

- . Safety railing around the dipnetting area designed to withstand at least 200-lb force lateral pressure.
- . Insulated generator exhaust housing which pipes exhaust away from workers while protecting against the potential for contacting hot exhaust manifolds which may cause burns.
- . Grounded and bonded surfaces to eliminate differences in electrical potential that may result in electric shock.

- . "Dead-man" switches linked in series so that each dip netter must depress his switch in order to complete the circuit.

#### 3.3.10.3 Electrofishing Training

Prior to working onsite, all electrofishing crew members will have received operation-specific training from personnel experienced in this type of work which includes:

- . Potential hazards
- . Safe operating procedures for electrofishing and for safe boating
- . Emergency first aid procedure for drowning, unconsciousness, and electric shock
- . Towing and backing of boat trailers
- . Use of life jackets and other safety and health equipment

The trainer will ensure that all personnel involved in this operation demonstrate proficiency in operation of boat trailers, boats, and electrofishing equipment.

#### 3.3.10.4 General Safety Precautions

- . Fire Extinguisher

Each boat will be equipped with at least one 5-lb type ABC fire extinguisher mounted in a holder for easy access to the boat operator and away from high fire potential sources.

. Personal Flotation Devices

All occupants will wear U.S. Coast Guard approved personal flotation devices at all times. Life vests that meet the requirements of Type II are designed to turn an unconscious person in the water from a face downward position to a vertical or slightly backward position. Float coats may provide some protection against the loss of body heat if the person were to accidentally fall into cold water.

. Standard Safety Equipment

- Hip boots will be worn so they can be easily removed in case the boat capsizes.
- Rubber chest waders will also be worn when necessary in order to remain dry as protection against electrical shock.
- Rubber gloves will be worn that are rated above the voltage being used. These will be inspected before each use and replaced at adequate intervals.
- Polaroid-type sunglasses will be worn to reduce glare from the water.

. Color Coding/Labeling of Significant Hazards

To ensure visibility, the color red will be used to identify fire extinguishers, safety cans, and stop buttons for electrical equipment. The color fluorescent orange will be used to identify all other safety switches.

- . Dip Net

The dip net shall not be used as an electrode. Net handles shall be constructed of a nonconductive material such as nylon or wood, and should be of sufficient length to avoid hand contact with water. Aluminum wrapped in glass fiber may be used.

- . Maintenance Schedule

Because electrofishing equipment is exposed to water, the need to check wiring periodically for corrosion is important. A schedule for maintenance inspection should be developed with the time intervals being dependent upon the frequency of use and the severity of the exposure.

- . Warning

Where appropriate, supervisors must provide adequate warning and take positive steps to assure that the public is not exposed to the potential hazards of electrofishing operations. In addition, only a minimum number of employees (or others) shall participate in electrofishing operations.

- . Gauges

Adequate instrumentation shall be provided to monitor the electrical power equipment on the boat.

- . Refueling

To refuel the generator/alternator, all equipment shall be turned "off," and hot surfaces allowed to cool. no electronic gear may be used during fueling, which must take place in an open area. It is recommended that all tanks be filled prior to each operation.



. Storms

- Electrofishing shall not take place during electrical storms, rain, high winds, or any other conditions considered unsafe by the crew supervisor.
- Only qualified personnel will be allowed to participate in electrofishing operations. Infrequent exceptions to this rule may be made and only with approval of the project manager and the CSHO.

. Operations

Electrofishing operations will not be conducted in the near vicinity of other craft. Maintain a minimum of 100 ft (30 m) between the boat and other vessels.

TABLE 3-1 HAZARDOUS SUBSTANCES DETECTED AT FORT GEORGE G. MEADE SANITARY LANDFILL

Contaminant	Maximum Concentration Detected (a)				Routes of Exposure Inh, Ing, Derm	Signs and Symptoms of Exposure Eyes, nose, and throat irritation; headache, dizziness; dermatitis
	Ground Water 37.0	Surface Water --	Leachate (b) --	Soil (b) --		
Acetone						
Antimony	11.4	4.10	5.64	--	Inh, Derm	Irritation of nose, throat, mouth; cough; dizziness; headache; nausea, vomit, diarrhea; cramps; insomnia; irritated skin; unable to smell; cardiac
Arsenic	16.6	8.44	11.6	--	Inh, Abs, Derm, Ing	Carcinogen; GI disturbance; peripheral neuropathy; respiratory irritation
Asbestos			Historical Record	0.2 fibers/cc		Carcinogen; restricted pulmonary function; interstitial fibrosis
Atrazine	40.9	--	--	--	NA	NA
Benzene	24.0	--	7.20	--	Ing, Derm	Irritation of eyes, nose, respiratory system; giddy; headache; nausea; staggered gait; fatigue, anorexia, lassitude; dermatitis; bone marrow depressant; abdominal pain; carcinogenic
Beryllium	--	--	--	0.503	Inh	Respiratory symptoms, weakness, fatigue, weight loss; carcinogen

(a) Data obtained from Phase I and II sampling and analysis of Fort George G. Meade Active Landfill by EA June - August 1989.

(b) Ground water, surface water, and leachate data are measured in  $\mu\text{g/L}$  unless otherwise indicated. Soil data are presented in  $\mu\text{g/g}$ .

(c) Permissible Exposure Level (OSHA) or Threshold Limit Value (ACGIH) for time-weighted average exposure for an 8-hour workday or 40-hour workweek. The most conservative value is listed in this column.

Inh = Inhalation

Ing = Ingestion

Derm = Dermal Contact

Abs = Skin Absorption

NA = Not Available

TABLE 3-1 (Cont.)

Contaminant	Maximum Concentration Detected (a)				Routes of Exposure	Signs and Symptoms of Exposure
	Ground Water	Surface Water	Leachate (b)	Soil (b)		
Bis(Ethylhexyl)phthalate	98.0	--	--	--	Inh, Derm, Ing	Irritated eyes, muscles, mucous membranes, nausea, diarrhea; carcinogen
2-Butanol (sec. butyl alcohol)	--	--	500	--	Inh, Ing	Eye irritation; narcosis; dry skin
2-Butanone	--	--	150	--	Inh, Ing	Irritation of eyes, nose, and throat; headaches, dermatitis; dizziness
Cadmium	--	--	0.007 ppm	--	Inh, Ing	Carcinogen; pulmonary edema; tight chest; headaches; chills; nausea; mild anemia
Chlorobenzene	18.0	--	--	--	Inh, Ing, Derm	Irritated skin, eyes, nose; drowsiness; liver damage
Chloroethane (ethyl chloride)	9.0	--	10	--	Inh, Abs, Ing, Derm	Inebriation; abdom. cramps; cardiac arrhythmia & arrest; liver and kidney damage
Chromium	6.2	--	0.093 ppm	13.6	Inh, Ing	Fibrosis of lungs; carcinogen
Copper	30.1	--	--	15.1	Inh, Derm, Ing	Irritation of mucous membrane, pharynx; nasal perforation; eye irritation; metal taste; dermatitis
Cresol	--	--	0.5 ppm	--	Inh, Abs, Ing, Derm	CNS effects; depression; respiratory failure; weak pulse; skin, eye burns
1,2-Dichlorobenzene	--	--	9.8	--	Inh, Abs, Ing, Derm	Irritable nose, eyes; liver, kidney damage; skin blister
1,4-Dichlorobenzene	22.0	--	--	--	Inh, Ing, Derm	Headache; eye irritation; swell periorbital; profuse rhinitis; anorexia, nausea, vomit; low-weight; jaundice, cir
1,1-Dichloroethane	--	--	--	0.37	Inh, Ing	CNS depression; skin irritant; drowsiness; unconsciousness; liver, kidney damage

TABLE 3-1 (Cont.)

Contaminant	Maximum Concentration Detected (a)				PEL/TLV (c)	Routes of Exposure	Signs and Symptoms of Exposure
	Ground (b) Water	Surface (b) Water	Leachate (b)	Soil (b)			
1,2-Dichloroethane (ethylene dichloride)	--	--	70	--	1 ppm	Inh, Abs Ing, Derm	Irritation of the respiratory tract; narcosis; conjunctivitis
Diethylphthalate	--	--	1,200	--	5 mg/m <sup>3</sup>	Inh, Ing Derm	Irritation of mucous membranes; stomach pain
2,4-Dimethylphenol	11.0	--	--	--	NA	NA	NA
Di-N-Octyl-Phthalate	96.0	--	--	--	NA	NA	NA
Ethylbenzene (styrene)	91.0	--	27	--	100 ppm	Inh, Ing, Derm	Irritation of eyes and mucous membranes; headaches; dermatitis; narcosis; coma
2-Hexanone	--	--	100	--	5 ppm	Inh, Ing, Derm	Eye & nose irritant; peripheral neuropathy; headache
Lead	8.8	--	0.02 ppm	--	0.05 mg/m <sup>3</sup>	Inh, Ing, Derm	Insomnia; low weight; malnutrition; constipation; abdominal pain; anemia
Mercury	0.37	--	0.36	0.032	0.01 mg/m <sup>3</sup> (alkyl) 0.05 mg/m <sup>3</sup> (other)	Inh, Ing Derm	Cough; bronchial pneumonia; insomnia; irritability; headache; fatigue; low weight; skin and eye irritant
3-Methyl-2-butanone (methyl isopropyl ketone)	--	--	200	--	200 ppm	Inh	Eye and mucous membrane irritation; headache; dermatitis; narcosis
Methylene chloride	--	--	260	--	100 ppm	Inh, Ing, Derm	Weakness, light-headedness; numbness of the limbs; nausea; skin and eye irritation; vertigo; suspect carcinogen
Methyl isobutyl carbinol (4-methyl-2-pentanol)	--	--	15	--	25 ppm	Inh, Ing Derm	Eye irritant; headache; drowsiness
4-Methyl-2-pentanone (hexanone)	--	--	40	--	50 ppm	Inh, Ing Derm	Eye and mucous membrane irritation; headache; narcosis; coma; dermatitis

TABLE 3-1 (Cont.)

Contaminant	Maximum Concentration Detected (a)				PEL/TLV (c)	Routes of Exposure	Signs and Symptoms of Exposure
	Ground (b) Water	Surface (b) Water	Leachate (b)	Soil (b)			
"Mustard" Gas (2,2-dichloroethyl sulfide)			Historical Record		0.0001 mg/m <sup>3</sup> , (b)		
Naphthalene	--	--	10	--	10 ppm	Inh, Ing, Derm	Eye irritant; headache; excitement; nausea; vomiting; profuse perspiration
Nickel	44.8	--	27.7	96.0	1 mg/m <sup>3</sup>	Inh, Derm, Ing	Sensitization dermatitis; allergic asthma; nasal cavities, pneumonitis; (carcinogenic)
Nitrogen dioxide	--	--	0.03 ppm	--	3 ppm	Inh, Ing, Derm	Cough; chest pain; cyanosis; pulmonary edema; eye irritant
2-Pentanone	--	--	50	--	200 ppm	Inh, Ing, Derm	Eye, nose, and throat irritation
Phenol	--	--	300	--	5 ppm	Inh, Ing, Derm	Eye, nose, and throat irritant; muscle ache; liver and kidney damage
Pyridine	--	--	0.75 ppm	--	5 ppm	Inh, Ing, Derm	Headache; insomnia; nausea; frequent urination; eye irritation; kidney and liver damage
Silver	10.1	--	0.92 ppm	1.44	0.1 mg/m <sup>3</sup> (metal) 0.01 mg/m <sup>3</sup> (soluble)	Inh, Ing, Derm	Blue-grey eyes; throat and skin irritant; GI ulceration
Tetrachloroethylene	54.0	--	18	--	50 ppm	Inh, Ing, Derm	Eye, nose, and throat irritation; nausea; flush face and neck; dizziness; headache; suspect carcinogen
Toluene	22.0	--	130	--	100 ppm	Inh, Ing, Derm	Myocytic anemia; narcotic in high concentrations

TABLE 3-1 (Cont.)

Contaminant	Maximum Concentration Detected (a)				PEL/TLV (c)	Routes of Exposure	Signs and Symptoms of Exposure
	Ground (b) Water	Surface (b) Water	Leachate (b)	Soil (b)			
1,1,1-Trichloroethane	--	--	--	0.053	350 ppm	Inh, Ing, Derm	Headache; lassitude; CNS depression; poor equilibrium; irritated eyes; dermatitis; cardiac arrhythmia
Trichloroethylene	7.0	--	40	--	50 ppm	Inh, Ing, Derm	Headaches; nausea, vomiting; vertigo, eye irritation, cardiac arrhythmia; tremors; dermatitis
Vinyl Chloride	29.0	--	--	--	1 ppm	Inh	Weakness, abdominal pain; GI bleeding; hematomegaly, pallor or cyanosis of the extremities; carcinogen
Xylene	19.0	--	--	--	100 ppm		Dizziness, excitement, drowsiness, incoordination, staggering gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia, vomiting, abdominal pain; dermatitis
Zinc	1,730	32.4	12.3	29	10 mg/m <sup>3</sup>	Inh, Derm	Metal fume fever; nausea, chills; shortness of breath; chest pain

#### 4. TRAINING

##### 4.1 SITE WORKERS

All personnel who will perform onsite tasks shall be trained as required by U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) standard, 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response. Training will include:

- . A minimum of 40 hours initial instruction offsite.
- . A minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor.
- . Additional training which addresses any unique or special hazards.
- . 8 hours of annual refresher training.

The date of training for each site worker will be documented on Attachment A, Site Worker Training and Physical Examination Record.

##### 4.2 ONSITE MANAGEMENT AND SUPERVISORS

Onsite management and supervisors directly responsible for or who supervise employees onsite shall receive at least 8 additional hours of specialized training on managing such operations.

##### 4.3 SITE VISITORS

Site visitors and other individuals who enter the Exclusion Zone must attend a pre-entry briefing where they will be briefed about site operations, potential hazards, and the necessary precautions. All visitors must be accompanied by EA or UXB escort when visiting the site.

#### 4.4 PRE-ENTRY ORIENTATION SESSION

Prior to entering the site, personnel shall attend a pre-entry orientation session presented by the Site Safety and Health Supervisor (SSHS) which addresses the following issues. All personnel shall verify attendance at this meeting by signing the Safety and Health Plan Review Record, Attachment B.

##### 4.4.1 Degree and Nature of Potential Health and Safety Hazards

The health effects and hazards of the chemicals identified or suspected to be on the site shall be discussed. The physical and chemical properties of the contaminants, the most likely route of exposure, and possible adverse consequences of working on the site if proper safety procedures are not observed or if protective equipment fails or is improperly worn shall be reviewed. Other hazards which are unique to site operations shall be discussed.

##### 4.4.2 Personal Protective Equipment

Personnel shall be instructed in the use, care, maintenance, limitations, and fitting of personal protective equipment. Respirator training shall conform to ANSI Z88.2 (1980) and OSHA 29 CFR 1910.134 and shall include instruction in positive/negative testing to be performed by the user each time a respirator is donned. Personnel shall not be fit tested or issued a respirator if facial hair interferes with the face-to-facepiece seal of the respirator.

##### 4.4.3 Decontamination Procedures

The procedures, materials, equipment, and facilities specific to the site will be discussed.



#### 4.4.4 Accepted Practices

Specific safe work practices which must be adhered to during site operations will be discussed. This will include procedures for entering and exiting the site and accepted and unaccepted practices within the personnel decontamination zone area.

#### 4.4.5 Emergency Procedures

Procedures for responding to emergencies as specified in the Emergency Response Plan shall be covered.

#### 4.4.6 Medical Requirements

The medical requirements for all personnel assigned to perform work at the site shall be presented.

#### 4.5 ASBESTOS INSPECTORS

All personnel performing asbestos inspections and/or sampling must have received, at a minimum, the 24-hour EPA Inspector Training Course accreditation.

## 5. MEDICAL REQUIREMENTS

All site workers assigned to tasks in the Exclusion Zone and Contamination Reduction Zone shall have satisfactorily completed a comprehensive occupational physical examination within the past 12 months as per 29 CFR 1910.120. The purpose of the examination is to determine each worker's ability to perform the work and wear a respirator. The date of physical examination of each site worker is documented on Attachment A, Site Worker Training and Physical Examination Record.

### 5.1 EXAMINATION PROTOCOL

The protocol for the examination will be determined by the examining physician. However, minimum requirements for the baseline physical shall include the following:

- . Occupational and medical history
- . Complete physical examination
- . Vision screen
- . Audiogram
- . Electrocardiogram (if indicated)
- . Pulmonary function test
- . Chest X-ray
- . Complete blood count with differential and platelets
- . Biochemical blood profile
- . Urinalysis with microscopic examination

The examination must be repeated at least annually and whenever an employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards or the employee has been exposed above the established exposure levels in an emergency situation. The examination will also be performed whenever an employee is terminated or reassigned to work that does not involve hazardous waste.

## 5.2 INFORMATION PROVIDED TO THE PHYSICIAN

Prior to the medical examination, EA will provide employee exposure information for each individual to the examining physician. This information shall be updated annually. The information shall include:

- . A description of the employee's duties as they relate to the employee's exposure.
- . The employee's exposure levels or anticipated exposure levels.
- . A description of any personal protective equipment used or to be used.

## 5.3 PHYSICIAN'S WRITTEN OPINION

The physician shall provide a written opinion regarding each examined employee which includes the following:

- . The results of the medical examination and tests. The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.
- . The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or from the use of respirators.
- . The physician's recommended limitations upon the employee's work assignment.
- . A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

- . The physician will also inform the employee of the results of the examination.

#### 5.4 LOST-TIME ILLNESS

Any employee who develops a lost-time illness or injury must report immediately to the Site Safety and Health Supervisor (SSHS) who will complete the standard EA Accident Investigation Report (Attachment E) and take corrective action as necessary.

#### 5.5 RECORDKEEPING

An accurate record of the medical surveillance required for this program will be retained for 30 years as specified by 29 CFR 1910.20. Records for other contractor employees or subcontractor employees also will be kept by their employer for this time period.

The employee's medical surveillance record will include, at a minimum, the following:

- . The employee's name and social security number
- . The physician's written opinion
- . Any employee medical complaints related to exposure to hazardous substances
- . Respiratory fit-testing demonstration
- . A copy of any information provided to the examining physician by the employer.

## 6. PERSONAL PROTECTIVE EQUIPMENT

All respiratory protective equipment must be approved by the National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA). Minimum protective equipment requirements are described below for each work operation for areas where no mustard is suspected to be present. PPE to be worn for protection against unknowns at Sites 2 and 3 is discussed in Section 6.5.

### 6.1 LEVEL B PROTECTION

The following personal protective equipment is required to be worn in Level B work areas:

- . Self contained breathing apparatus (SCBA)
- . Poly-coated chemical resistant coveralls (Saranex coveralls for selected locations at former landfills 2 and 3)
- . Nitrile outer gloves (butyl rubber gloves for selected locations at former landfills 2 and 3)
- . Latex inner gloves
- . Steel toe/shank boots with chemical-resistant soles
- . Disposable boot covers
- . Hard hat

### 6.2 LEVEL C PROTECTION

The following personal protective equipment is required to be worn in Level C Work Zones:

- . Full-facepiece, air-purifying respirator with combination organic vapor and high-efficiency particulate cartridges.
- . Chemical-resistant poly-coated coveralls (Saranex coveralls for selected locations at former landfills 2 and 3).
- . Nitrile outer gloves (butyl rubber gloves for selected locations at former landfill sites 2 and 3).
- . Latex inner gloves.
- . Steel toe and shank boots with chemical resistant soles.
- . Disposable boot covers.
- . Hard hat (if overhead hazards are present).

### 6.3 MODIFIED LEVEL D PROTECTION

The following personal protective equipment is required to be worn in Modified Level D Work Zones:

- . Poly-coated chemical resistant coveralls (Saranex coveralls for selected locations at former landfills 2 and 3)
- . Nitrile outer gloves (butyl rubber gloves for selected locations at former landfills 2 and 3)
- . Latex inner gloves
- . Steel toe and shank boots with chemical-resistant soles
- . Disposable boot covers

- . Safety glasses/goggles (if splash hazard exists)
- . Hard hat (if overhead hazard is present)

#### 6.4 LEVEL D PROTECTION

The following personal protective equipment is required to be worn in Level D Work Zones:

- . Poly/cotton coveralls
- . Steel toe and shank boots/shoes with chemical-resistant soles
- . Nitrile gloves (if contact with potentially contaminated soil or water is expected)
- . Hard hat (if overhead hazard is present)
- . Safety goggles/glasses (if splash hazard is present)

#### 6.5 MAINTENANCE AND IN-USE INSPECTION OF PROTECTIVE EQUIPMENT

Effective use of protective equipment requires that the equipment be properly used, maintained, and inspected periodically during the day. Site-specific issues and standard procedures will be reiterated during pre-entry training.

##### 6.5.1 Gloves/Body Coverings

Gloves and coveralls will be regularly inspected and replaced promptly if torn. Disposable coveralls will be replaced whenever personnel leave the Exclusion Zone, daily at a minimum. Reusable gloves will be decontaminated whenever exiting the Exclusion Zone or Contamination

Reduction Zone. Non disposable coveralls must be laundered daily at a minimum.

#### 6.5.2 Respirators

Respirators will be inspected and checked daily for leaks both visually and with negative or positive pressure checks on the wearer. Respirator cartridges will be replaced daily or more frequently if excessive resistance develops or if breakthrough occurs. All respirator maintenance will be performed by the Site Safety and Health Supervisor (SSHS).

Respirator exteriors will be wet-wiped whenever exiting work areas, as specified in Section 9.4. Respirators will be rinsed with a solution containing a sanitizer recommended by the respirator manufacturer. Respirators will then be hung to drip dry and, if not used daily, will be placed inside plastic bags for protection against dust.



## 7. ENVIRONMENTAL MONITORING

### 7.1 GENERAL

A direct-reading total volatile organics instrument [flame ionization detector (FID) or photoionization detector (PID)] shall be used to periodically monitor airborne concentrations of volatile contaminants on the site and in the employee breathing zone.

A direct-reading total respirable dust monitor will be used to detect concentrations of airborne particulates which may be contaminated by the various heavy metals reported to be present onsite.

Monitoring for flammable/combustible gases shall be performed whenever drilling is performed at Fort Meade. A combustible gas indicator/oxygen analyzer shall be used.

Monitoring for chemical agents shall be performed using an M-18 A2 chemical detector kit during any invasive operation.

The monitoring program may be increased, reduced, or modified by the EA Corporate Safety and Health Officer (CSHO) with concurrence of the Contracting Officer, based on site conditions and monitoring results. All monitoring will be accomplished under the direction of the EA Site Safety and Health Supervisor (SSHS) who will interpret the results.

### 7.2 REAL TIME AIR MONITORING

The air monitoring program will include sufficient monitoring of air quality in work zones and other onsite areas to assess levels of employee exposure, determine that the work zone designations are valid, and verify that the respiratory protection being worn by personnel is adequate. The air monitoring program is also designed to ensure that contaminants are not migrating offsite in order to minimize exposure of nearby populations and/or workers.

Monitoring must be conducted:

- . When work begins on a different portion of the site.
- . When contaminants other than those previously identified are being handled.
- . When a different type of operation is initiated.
- . If personnel are working in areas with obvious liquid contamination.
- . If a sufficient reasonable interval has passed so that exposures may have significantly increased.

Measurements shall be taken at the anticipated source and in the breathing zone of site personnel during all invasive operations. Response action levels are presented in Table 7-1.

Instruments shall only be used by employees who have been trained in the proper operation, use, limitations, and calibration of the monitoring instrument and who have demonstrated the skills necessary to operate the instrument.

#### 7.2.1 Perimeter Monitoring

If detectable concentrations are measured during the operations monitoring, monitoring shall also be conducted at least two times each day with a total volatile organics direct-reading instrument and respirable dust monitor at the perimeter of each site. If airborne levels of contaminants exceed background levels at the perimeter of any site, the work will be stopped and the suspected source of the contamination (borehole or monitoring well) will be covered to eliminate emissions. If the emissions are not reduced in a reasonable period of time (i.e., 15 minutes),

the EA CSHO and the Project Manager will be notified. A decision will then be made as to how to proceed with the work and how to more fully characterize the airborne emissions.

#### 7.2.2 Flammable/Combustible Gases

Monitoring at potential sources of combustible gases shall be conducted periodically during operations involving penetration of soils in the fire training area, current landfill, and former landfill sites. If instrument readings indicate between 10 and 25 percent lower explosive limit (LEL), work shall continue with increased monitoring. If readings exceed 25 percent LEL, operations shall cease and personnel will withdraw until levels subside (at least 15 minutes).

#### 7.2.3 Unknowns

Monitoring will be performed initially and continually during selected drilling operations at former landfill sites 2 and 3, using an M-18 detection kit according to the procedures detailed in Attachment H. No operations will be performed in these areas without monitoring.

#### 7.2.4 Respirable Dust

Monitoring for respirable dust will be necessary to estimate employee exposure to heavy metals and semivolatile organic compounds which may comprise part of or be adhered to dust particles generated during site operations. Continuous monitoring of the site workers' breathing zone will be performed during all drilling operations using a direct-reading respirable dust monitor where the generation of dust is likely.

#### 7.2.5 Calibration and Maintenance

All direct-reading instruments must be calibrated on a daily basis. A known concentration of a specific gas (usually isobutylene or methane,

depending on the instrument) will be used. Instructions in the manufacturers' operations manuals regarding cleaning and maintenance of the instruments shall be followed.

#### 7.2.6 Recordkeeping Requirements

The results of air monitoring readings shall be recorded on standard air monitoring data forms as illustrated by Attachment C. A calibration and maintenance log for each instrument shall also be maintained.

### 7.3 HEAT-STRESS MONITORING

Ambient temperatures at the site combined with the requirements for personal protective equipment (PPE) use may contribute to heat stress. While using nonpermeable PPE when ambient temperatures reach or exceed 70 F, heart rates will be monitored as discussed in Section 3.3.4. Work-rest regimens will be adjusted accordingly (see Section 3.3.4).

TABLE 7-1 REAL TIME AIR MONITORING REQUIREMENTS AND RESPONSE ACTION LEVELS

Site	Operation	Instrument	Location of Monitoring	Frequency	Action Level	Response
UST sites	Drilling ops	Total Volatile Organics (a)	Breathing zone	Periodically	10 ppm above bkgd	Upgrade to Level C PPE
					>100 ppm	Site Evacuation or Level B PPE (b)
					10-25% LEL	Proceed with extreme caution
	GW sampling	Respirable Dust	Breathing zone in dry areas	Periodically	>25% LEL	Stop work; with-draw from site (b)
					>10 mg/m <sup>3</sup>	Upgrade to Level C PPE
					10 ppm above bkgd	Upgrade to Level C PPE
	Soil Sampling	Total Volatile Organics (a)	Breathing zone	Periodically	>100 ppm	Site Evacuation or Level B PPE (b)
					10 ppm above bkgd	Upgrade to Level C PPE
					>100 ppm	Site evacuation or Level B PPE (b)
					10-25% LEL	Proceed with extreme caution
		CGI/O <sub>2</sub> meter (c)	Auger opening	Periodically	>25% LEL	Stop work; with-draw from site (b)

TABLE 7-1. (Cont.)

Site	Operation	Instrument	Location of Monitoring	Frequency	Action Level	Response
Landfills	Drilling ops	Total Volatile Organics (a)	Breathing zone	Periodically	Above bkgd	Upgrade to Level C PPE
		CGI/O <sub>2</sub> meter	Auger opening	Periodically	>5 ppm	Site evacuation or Level B PPE (b)
	GW sampling	Respirable Dust	Breathing zone in dry areas	Periodically	>25% LEL	Proceed with extreme caution
		Total Volatile Organics (a)	Breathing zone	Periodically	>10 mg/m <sup>3</sup>	Stop work; withdraw from site (b)
	Soil Sampling	Total Volatile Organics (a)	Breathing zone	Periodically	Above bkgd	Upgrade to Level C PPE
		CGI/O <sub>2</sub> meter (c)	Auger opening	Periodically	>5 ppm	Site evacuation or Level B PPE (b)
		Respirable Dust	Breathing zone in dry areas	Periodically	>25% LEL	Proceed with extreme caution
				Periodically	>10 mg/m <sup>3</sup>	Stop work; withdraw from site (b)

TABLE 7-1 (Cont.)

Site	Operation	Instrument	Location of Monitoring	Frequency	Action Level	Response
Ordnance Disposal Area	Soil Sampling	Total Volatile Organics (a)	Breathing zone	Periodically	Above bkgd	Upgrade to Level C PPE
					>5 ppm	Site evacuation or Level B PPE (b)
					>10 mg/m <sup>3</sup>	Upgrade to Level C PPE
Fire Training Pits	Drilling Ops	Respirable Dust	Breathing zone in dry areas	Periodically	10 ppm above bkgd	Upgrade to Level C PPE
					>100 ppm	Site evacuation or Level B PPE (b)
					10-25% LEL	Proceed with extreme caution
Landfills 2 & 3 (d)	All invasive operations	M18 A2 Detector kit	Point of soil penetration or emission source	Periodically	>25% LEL	Stop work; withdraw from site (b)
					>10 mg/m <sup>3</sup>	Upgrade to Level C PPE
					Continuously	Site Evacuation; Contact CSHO

TABLE 7-1 (Cont.)

Site	Operation	Instrument	Location of Monitoring	Frequency	Action Level	Response
Soldier Lake & Wetlands Survey Areas	SW/Sediment Sampling	Total Volatile Organics (a)	Breathing zone	Periodically	Above bkgd	Upgrade to Level C PPE
					> 5 ppm	Site evacuation or Level B PPE (b)
	Soil Sampling	Total Volatile Organics (a)	Breathing zone	Periodically	Above bkgd	Upgrade to Level C PPE
		Respirable Dust	Breathing zone in dry areas	Periodically	> 5 ppm > 10 mg/m <sup>3</sup>	Site evacuation or Level B PPE (b) Upgrade to Level C PPE

(a) Actions for total volatile organics monitoring should be taken based on sustained readings (i.e., 5 minutes) in the breathing zone.

(b) Work areas must be evacuated for at least 15 minutes before monitoring is repeated to determine if levels have dissipated. If evacuation action levels for mustard gas are reached, work is shutdown until the appropriate army personnel have decided on a course of action.

(c) For soil sampling, monitoring with a CGI/O<sub>2</sub> meter is required only during drill rig activities, not during hand augering or surface soil sampling.

(d) At Former Landfill Sites 2 & 3, monitoring for total volatile organics, combustible gases, and respirable dusts is also required, depending on the area.



## 8. SITE CONTROL

Only personnel identified as "authorized" will be permitted to enter the site. A master list of authorized personnel will be available and will only include personnel who have received the appropriate training and medical certification required by this Safety and Health Plan and OSHA requirements.

### 8.1 WORK ZONES

Work zones are designed to prevent employees, visitors, and the surrounding environment from exposure to contamination during all aspects of site investigation activities. All work zones and support areas will be established by EA. Movement of personnel and equipment between zones and on and off the site will be controlled by means of designated access points. Minimum personal protective equipment (PPE) for work in each zone is described in Section 6.

#### 8.1.1 Exclusion Zone

The Exclusion Zone encompasses the surface areas within a 50-ft radius around the location of drilling operations. A formal exclusion zone need not be established for other planned operations; however, steps must be taken to ensure that personnel and equipment are properly decontaminated (see Section 9) and that contaminated materials are not removed from the work area.

#### 8.1.2 Contamination Reduction Zone

The Contamination Reduction Zone will be established as a buffer zone between the Exclusion Zone and the Support Zone of each drilling site. All personnel and equipment leaving the Exclusion Zone will do so through the Contamination Reduction Zone. The personnel and equipment decontamination stations, described in Section 9, will be located in this zone.

### 8.1.3 Support Zone

The Support Zone will be established near the site entrance. No special clothing or protective equipment, except hard hats and leather or neoprene boots with steel toes, is required in this area. Operational and support facilities (supplies, equipment, storage, and maintenance areas) will be located in this area. No equipment or personnel will be permitted to enter the Support Zone from the Exclusion Zone without removal of all potentially contaminated PPE.

## 8.2 SITE ENTRY AND EXIT

All persons entering an Exclusion Zone will be required to wear the personal protective equipment specified in Section 6.

The following protocols will be followed when leaving the Exclusion Zone and Contamination Reduction Zone:

- . All personnel will exit through the designated exit points.
- . All personnel will proceed through appropriate decontamination, as specified in Section 9.

All protective equipment will be removed in the Contamination Reduction Zone.

## 8.3 COMMUNICATIONS

### 8.3.1 Internal

Should the use of PPE interfere with verbal communication, standardized hand signals will be used to maintain communications between personnel

in the various work zones throughout the duration of each specific operation. Hand-held two-way radios or cellular telephones will be used to communicate between the various sites during operations.

#### 8.3.2 External

Communications will be established between personnel in the Support Zone and emergency response personnel via cellular telephones. Emergency response procedures are discussed in more detail in Section 12.

### 8.4 BUDDY SYSTEM

All work operations will be scheduled so that no employee works alone on-site at any time. Each worker will maintain visual contact with another specified worker at all times. The buddy system will ensure against an employee becoming stressed, ill, or injured without a co-worker being aware of his or her condition. Workers must "watch out" for each other while working close to potential chemical and physical hazards.

### 8.5 SAFE WORK PRACTICES

#### 8.5.1 Site-Specific Practices

Safe work practices, which must be followed by all site workers, include:

- . Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the Exclusion and Contamination Reduction Zones and in the vicinity of all work operations. Break areas will be designated by the Site Safety and Health Supervisor (SSHS) for these activities.
- . Do not sit or kneel in areas of obvious contamination.

- . Hands and face must be thoroughly washed upon leaving the work area.
- . Repair or replace immediately any defective PPE.
- . Prescription drugs must not be taken by personnel unless specifically approved by a qualified physician.
- . When respirators are required, facial hair that interferes with the face-to-facepiece fit of the respirator will not be permitted.
- . Contact lenses will not be permitted to be worn onsite. When chemical splash hazards exist, full-facepiece respirators, safety glasses, or safety goggles must be worn.
- . Personnel onsite must use the buddy system; visual contact must be maintained between team members at all times.

#### 8.5.2 Daily Start-up and Shutdown Procedures

The following protocols will be followed daily prior to start of work activities:

- . The EA SSHS will review site conditions to determine if modification of work and safety plans are needed.
- . Personnel will be briefed and updated on any new safety procedures.
- . All safety equipment will be checked for proper function.
- . The SSHS will ensure that first aid equipment is readily available.

- . The SSHS will initiate appropriate monitoring.

The following protocol will be followed at the end of daily operations and before breaks:

- . All personnel will proceed through appropriate decontamination procedures and facilities.

## 9. DECONTAMINATION

### 9.1 GENERAL

Employees will be trained in appropriate decontamination procedures that will be implemented during work operations at Fort Meade. Decontamination will be performed to minimize potential contamination of equipment and the spread of contamination from one zone to another.

### 9.2 PERSONNEL

No worker, except under emergency situations, will leave the Exclusion Zone without going through the proper decontamination sequences.

Before leaving Modified Level D or Level C work areas (the Exclusion Zone for drilling operations), personnel will wash boots and outer gloves at the decontamination station located at the Exclusion Zone/Contamination Reduction Zone boundary. The wash solution will be a simple detergent/water solution. Outer disposable clothing will be removed and placed in sealed 6-mil plastic bags for disposal. Exterior surfaces of respirators will be wet-wiped, then respirators will be removed and placed in a plastic bag for temporary storage and cleaning. All personnel then may pass into the Support Zone and leave the work area.

### 9.3 DECONTAMINATION NOTICE TO EMERGENCY PERSONNEL

Base emergency medical personnel and ambulance crews will be notified by EA before operations begin. They will be advised and warned of the possibility of having to handle contaminated clothes and/or injured workers, and they will be advised of appropriate decontamination procedures.

#### 9.4 RESPIRATOR DECONTAMINATION

When worn, respirators will be cleaned daily by the individuals to whom they have been assigned. Each individual will be responsible for cleaning and maintaining his/her own respirator. A wash basin or sink, with solution containing sanitizer recommended by the manufacturer, will be provided in the Contamination Reduction Zone for final rinsing of respirators at the end of the day. Respirators will then be hung to drip-dry and, if not used daily, will be placed inside plastic bags for protection against contamination. Respirator cartridges will be changed at least daily or more frequently if sampling data indicate potential saturation concentrations exist or breathing resistance becomes difficult. The Site Safety and Health Supervisor (SSHS) will also spot check respirators to ensure that they remain clean and are properly maintained and stored.

#### 9.5 EQUIPMENT DECONTAMINATION

All equipment being used in the Exclusion Zone will be subject to complete decontamination procedures before the equipment is removed from these work areas.

Equipment and vehicles which contact potentially contaminated soil will be decontaminated using a detergent solution and a steam cleaner or hot water pressure washer. All contaminated items will be carefully inspected and/or decontaminated to the satisfaction of the SSHS before being taken offsite.

#### 9.6 DISPOSAL OF WASTES GENERATED DURING INVESTIGATIVE ACTIVITIES

Waste solids generated by the investigative activities (including used respirator cartridges and disposable protective coveralls) will be drummed, labeled, and stored onsite for disposal as hazardous wastes. Suspect hazardous waste fluids generated during drilling activities will also be containerized in 55-gal drums and stored in the Contamination Reduction Zone for pick-up and disposal by Fort Meade personnel.

#### 9.7 LAUNDERING

Nondisposable work clothing and undergarments will be laundered by site personnel throughout the hazardous waste handling aspects of this project. All potentially contaminated articles will be washed separately from other laundry items.



## 10. EMERGENCY RESPONSE PLAN

Onsite emergencies will ultimately be handled by installation emergency support personnel. Initial response and first-aid treatment, however, will be performed by EA.

In case of a hazardous materials emergency, the senior EA supervisor onsite will assume full control and direction of the emergency response as the Incident Commander. The Incident Commander will work with the Site Safety and Health Supervisor (SSHS) to identify and evaluate hazards. All emergency responders and communications will be coordinated and controlled through the Incident Commander. When installation emergency response personnel arrive onsite, the Incident Commander shall brief installation personnel and relinquish control of the site to them.

### 10.1 EMERGENCY EQUIPMENT

Emergency equipment will be provided by EA. Emergency equipment for the Exclusion Zone will be kept in the Contamination Reduction Zone. At a minimum, the equipment must include:

- . Portable emergency eye wash with a capacity for providing clean water at a rate of at least 2 gallons per minute for a 20-minute period.
- . Two 20-lb multipurpose (ABC-rated) fire extinguishers.
- . An adequately stocked first-aid kit.

Another adequately stocked first-aid kit and an emergency air horn will be available in the Support Zone.

## 10.2 PRE-EMERGENCY PLANNING

Prior to the start of work, EA will contact local authorities to inform them of the start date and anticipated scope of work.

First-aid kits and at least one EA employee trained in first aid and cardiopulmonary resuscitation (CPR) will be onsite at all times during investigative activities.

## 10.3 EMERGENCY RECOGNITION AND PREVENTION

Emergency conditions that may be anticipated at the site include:

- . Medical emergency
- . Heavy equipment accident
- . Discovery of unanticipated buried hazards
- . Explosion and fire
- . Heat stress

To ensure that hazard recognition and accident prevention protocols are being maintained, personnel must follow the requirements of the SSSHP.

## 10.4 OPERATIONS SHUTDOWN

The SSHS has the authority to shut down work operations if, in his/her professional judgment, situations immediately dangerous to life and health exist. Operations shutdown may also be mandated by the Project Manager or the Site Manager on recommendation from the SSHS or by the emergency response Incident Commander. Conditions warranting work stoppage will include:

- . Uncontrolled fire
- . Uncovering potentially dangerous buried material, including chemical agents
- . Heat stress illness exhibited by the crew
- . Air contaminant concentrations in excess of the protection factors afforded by the respirators in use

When any of these conditions exist, operations will be stopped and the site secured. All personnel will leave the work area until the Incident Commander has determined that operations may resume (see Section 10.6).

#### 10.5 FIRE AND EXPLOSION RESPONSE PROCEDURES

Fires onsite can be started by natural events, work activities, or the activities of others. EA will have a multipurpose (ABC-rated) fire extinguisher on hand at all times. Personnel will be instructed in the use of these fire extinguishers by the SSHS and will attempt control of only very small fires. In the event of larger, uncontrolled fires, all personnel will evacuate the area immediately and the Incident Commander will notify the fire department. The procedure for using a fire extinguisher is to pull the safety pin, point the extinguisher at the base of the flames, and discharge the extinguisher by sweeping the flames from a distance of about 6 ft. The extinguisher operator should move in as the flames are being put out. EA will inform the base fire department immediately in case of any fire when its support will be required.

#### 10.6 EVACUATION FROM WORK ZONES

The evacuation area will be chosen by the SSHS and made known to all site workers during the daily pre-entry briefing. If an onsite emergency occurs, the Incident Commander will sound the site emergency alarm (long, regular blasts from the emergency air horn). All workers will meet at a

predesignated area located in the Support Zone. An employee headcount will be performed to ensure all workers are accounted for.

In case of emergency, evacuated employees may be decontaminated rapidly by removing exterior clothing. If a worker is critically injured in the Exclusion Zone, the worker may be removed immediately from the area--DO NOT take time to decontaminate an injured worker; seek medical attention immediately.

## 10.7 REPORTING INCIDENTS

### 10.7.1 Large-Scale Incidents

In the event of an environmental incident or the discovery of UXO or chemical agents, installation emergency response personnel shall be notified immediately. Evacuation of the area in question should be accomplished by the Site Manager and the SSHS. Additionally, EA's Corporate Safety and Health Officer (CSHO), Jill Breyse, and the USATHAMA Safety Officer should be notified. Emergency first aid shall be applied onsite as deemed necessary. The injured/ill individual will then be decontaminated (if necessary) and transported to the nearest medical facility, if needed. The rescue squad/ambulance personnel will be contacted for transport as necessary in an emergency; however, since some situations may require transport of an injured/ill party by other means, a hospital route is detailed in Attachment G.

### 10.7.2 Accidents, Injuries, Illnesses

In the event of any accident, injury, illness, or exposure, the SSHS will notify the CSHO, Jill Breyse, within 24 hours of the incident. All incidents will be reported on the Accident Investigation Report (Attachment E) by the SSHS. The Project Manager must ensure that a copy of the Accident Investigation Report is submitted to the CSHO within 24 hours of the incident. The following additional elements are required to be reported by USATHAMA:

- . Time of incident
- . Estimation of property damage
- . Nature of damage, including effect on production, operations, or other activities
- . Other damage or injuries sustained (public or private)
- . Whether a release was made to the news media (EA field personnel must not speak with reporters. All inquiries must be referred to the Budget Group Director.)
- . Any indication of sabotage or espionage

A copy of the accident report will be forwarded to Vivian Graham, USATHAMA Safety Officer.

#### 10.8 EMERGENCY MEDICAL TREATMENT AND FIRST AID

In the event of personal exposure to a site hazard, minimal response includes:

For skin/eye contact: Use copious amounts of water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. An emergency eye wash will be maintained onsite at all times in the Support Zone. Eyes should be rinsed continuously for 15 minutes if exposure occurs.

For inhalation exposure: Move victim to fresh air and/or, if necessary, decontaminate and transport to medical facility.

For ingestion:

Decontaminate person and transport to medical facility.

For Puncture Wound:

Decontamination and transport to medical facility.

## ATTACHMENT A

## SITE WORKER TRAINING AND PHYSICAL EXAMINATION RECORD

Site: Fort George G. Meade

[illegible]

ATTACHMENT B

## SITE SAFETY AND HEALTH PLAN REVIEW RECORD

SITE: Fort George G. Meade

I have read the Site Safety and Health Plan for this site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project. I agree to conform to all the requirements of this Plan.

[illegible]



ATTACHMENT C

ENVIRONMENTAL MONITORING RECORD

SITE: Fort George G. Meade

INSTRUMENT: \_\_\_\_\_

Time	Description of Location	Reading
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Calibration Information: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Technician \_\_\_\_\_

Date \_\_\_\_\_

# ATTACHMENT D

## EMERGENCY TELEPHONE NUMBERS

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SITE: Fort George G. Meade

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Police	Provost Marshall's Office	(301) 677-5320
Fire	Post Fire Department	(301) 677-4735
Ambulance	Kimbrough Army Hospital	(301) 677-2570
Hospital	Kimbrough Army Hospital	(301) 677-6876

Directions to hospital (Figure D-1): Specific directions to Kimbrough Army Hospital from each site or group of sites are presented on the following page.

EA Corporate Safety and Health Officer	(301) 771-4950	(work)
Jill V. Breyse	(301) 661-6749	(home)
EA Project Manager	(301) 771-4950	(work)
Steven A. Brown	(301) 747-6448	(home)
EA Medical Services, Center for	(301) 338-3704	
Environmental and Occupational	(301) 338-3000	
Health, Wyman Park Health System		
USATHAMA Project Manager	(301) 671-3261	(work)
Domonique Edwards		
USATHAMA Safety Officer	(301) 671-4811	(work)
Vivian Graham		
AUTOVON	(301) 584-4811	

## Site Specific Directions to Kimbrough Army Hospital

### Former Landfills

- Site 1           Exit site to the west  
Left (south) on Tank Rd. to New Tank Road  
Left on New Tank Rd. around airfield to Airfield Rd.  
Right on Airfield Rd. across bridge to O'Brian Rd.  
Left on O'Brian Rd. to Mapes Rd.  
Right on Mapes Rd. to Cooper Ave.  
Right on Cooper Ave to Llewellyn Ave.  
Left on Llewellyn Ave. for approx. 1/4 mile  
Hospital on right
- Sites 2 & 3       Exit site to south  
North on New Tank Rd. around airfield to Airfield Rd..  
Right on Airfield Rd. across bridge to O'Brian Rd.  
Left on O'Brian Rd. to Mapes Rd.  
Right on Mapes Rd. to Cooper Ave.  
Right on Cooper Ave to Llewellyn Ave.  
Left on Llewellyn Ave for approx. 1/4 mile  
Hospital on right
- Site 4           Exit site to New Tank Rd.  
Right on New Tank Rd. to Mapes Rd.  
Right on Mapes Rd. to Cooper Ave.  
Right on Cooper Ave. to Llewellyn Ave.  
Left on Llewellyn Rd. for approx. 1/4 mile  
Hospital on right
- Site 5           Exit site to Remount Rd.  
Remount Rd. to Zimborski Ave.  
Right on Zimborski Ave. to Wilson St.  
Left on Wilson St.  
Hospital on right approx. 1/2 mile

### SVCA Sites

- Waste Water       Exit site to the south  
Treatment       Left on Ft. Meade Rd. (Rt. 198) to Rt.32  
Plant           Move quickly to the left lane to Mapes Rd. (Rt. 198)  
Left on Mapes Rd. to Cooper Ave.  
Right on Cooper Ave. to Llewellyn Ave.  
Left on Llewellyn Ave. for approx. 1/4 mile  
Hospital on right

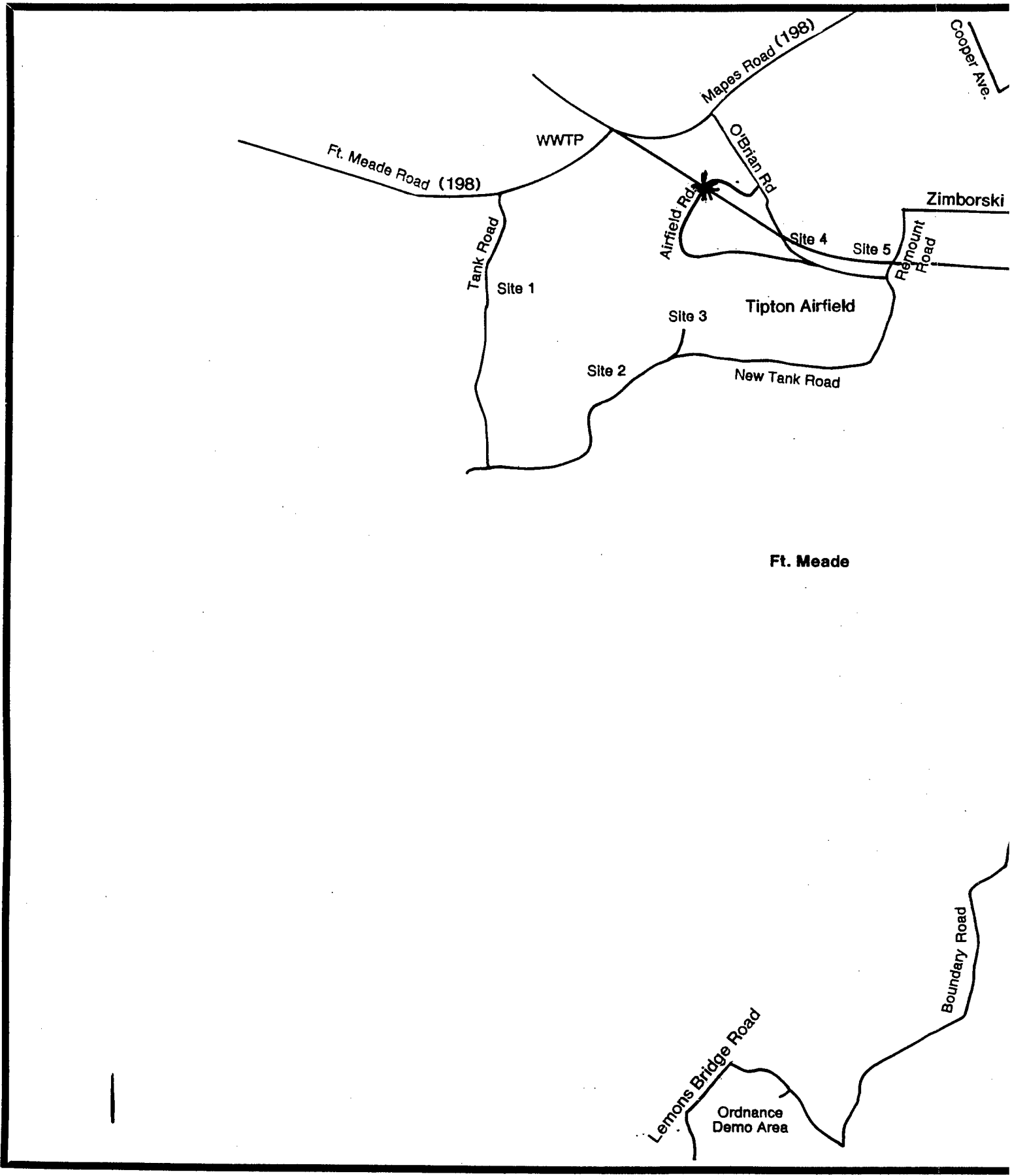
Tipton  
Airfield  
Sites  
Exit site onto Airfield Rd.  
Airfield Rd. to O'Brian Rd.  
Left on O'Brian Rd. to Mapes Rd.  
Right on Mapes Rd. to Cooper Ave.  
Right on Cooper Rd. to Llewellyn Rd.  
Left on Llewellyn Rd. for approx. 1/4 mile  
Hospital on right

Warehouse  
Area  
Sites  
Exit site to the north onto Rock Ave.  
Left on Rock Ave. to Wilson St.  
Right on Wilson St.  
Hospital on right approx. 1/2 mile

Sanitary  
Landfill  
North on Magazine Rd. to Rock Ave.  
Left on Rock Ave. to Wilson St.  
Right on Wilson St.  
Hospital on right approx. 1/2 mile

Clean Fill  
Dump  
Exit site to the east  
Left on Boundary Rd. to Magazine Rd.  
Left on Magazine Rd. to Pepper Rd.  
Left on Pepper Rd. across bridge to Rock Ave.  
Left on Rock Ave. to Wilson St.  
Right on Wilson St.  
Hospital on right approx 1/2 mile

Ordinance Demo  
Area  
Exit site to the west to Lemon's Bridge Rd.  
Right on Lemon's Bridge Rd. to South Rd.  
Right on South Rd.  
Left on hair-pin tin continuing on South Rd. to Boundary Rd.  
Right on Boundary Rd. to Magazine Rd.  
Left on Magazine Rd. to Pepper Rd.  
Left on Pepper Rd. across bridge to Rock Ave.  
Left on Rock Ave. to Wilson St.  
Right on Wilson St.  
Hospital on right approx. 1/2 mile



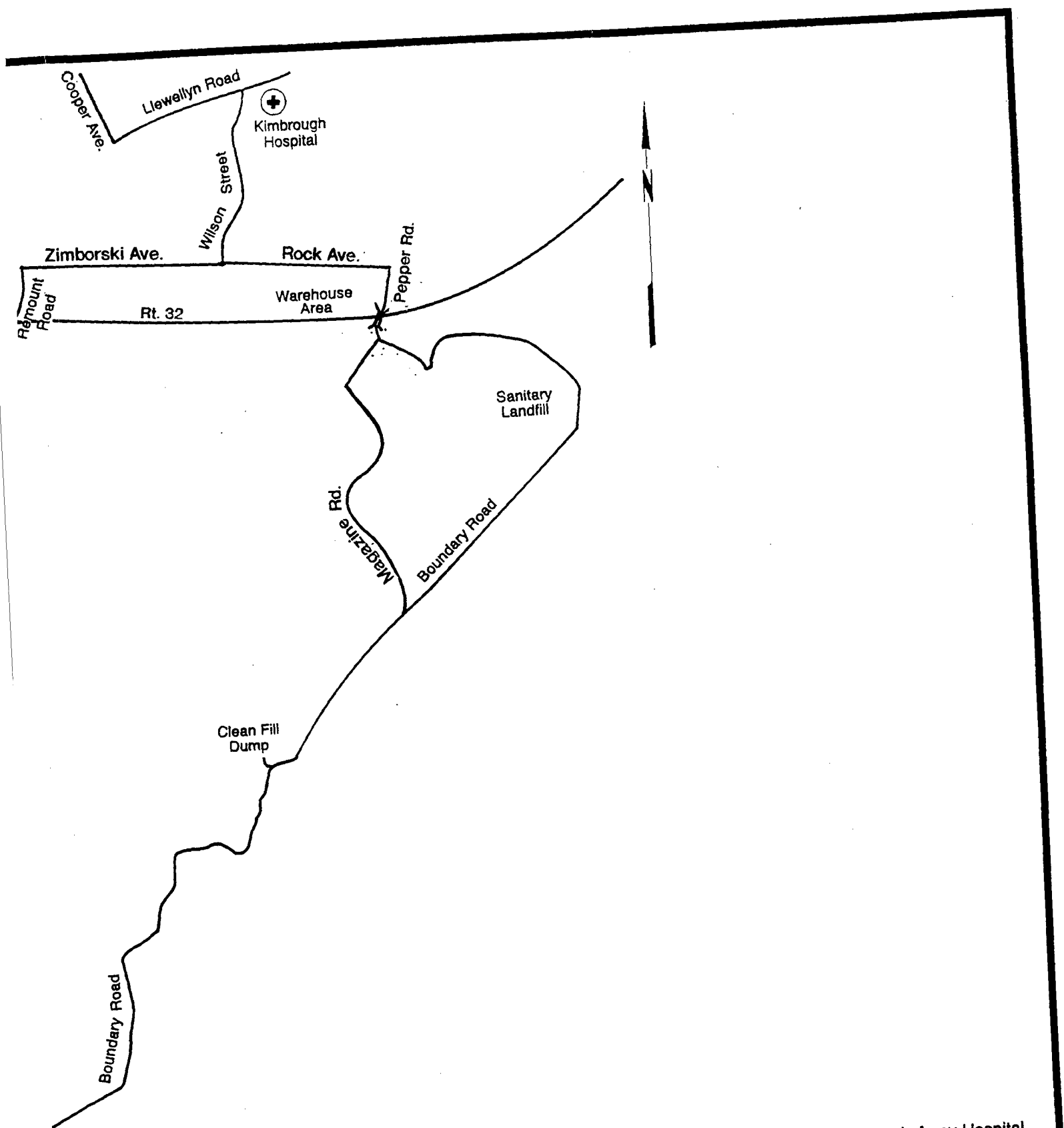


Figure D-1. Emergency routes to Kimbrough Army Hospital.



## ATTACHMENT E

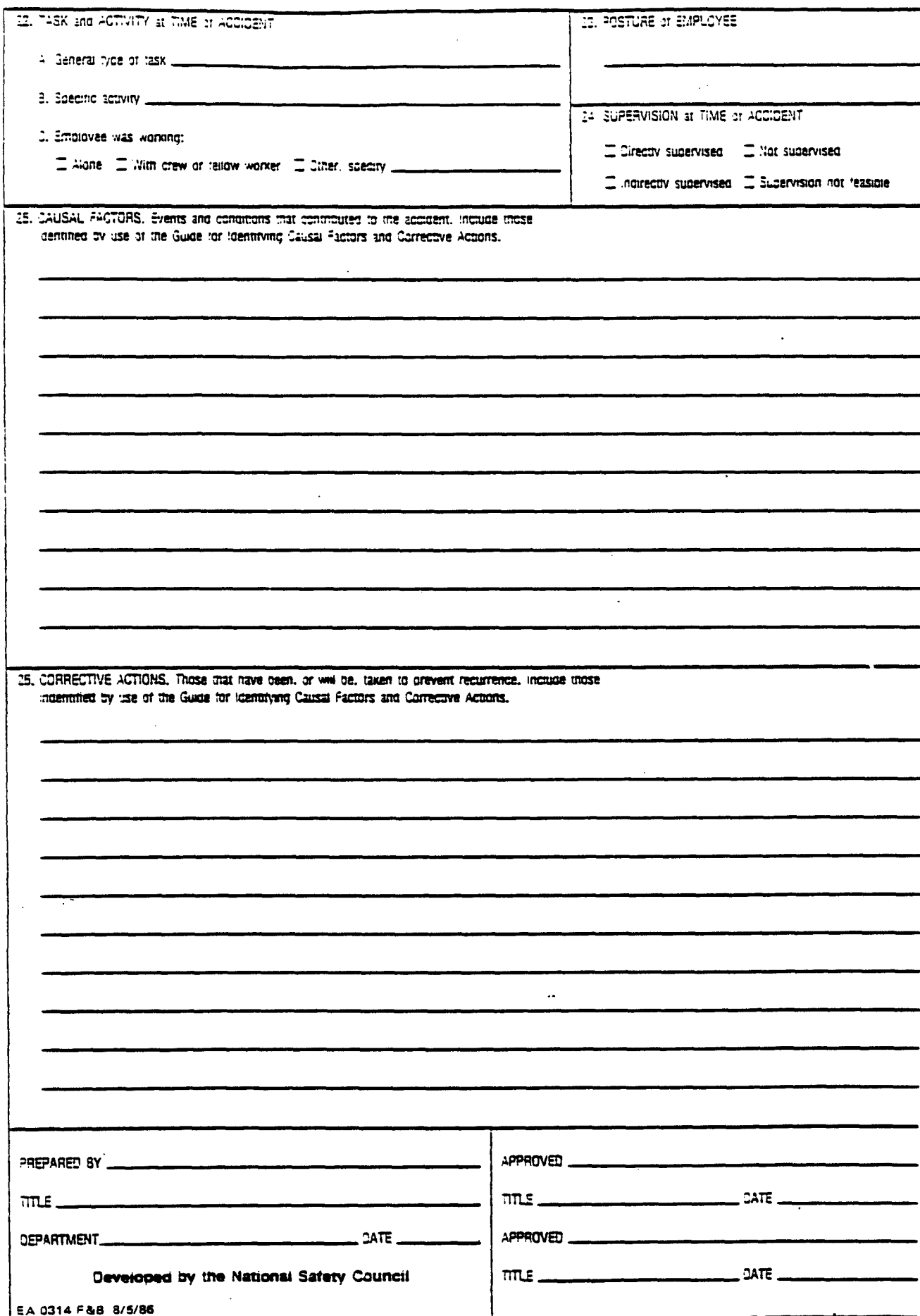
## ACCIDENT INVESTIGATION REPORT

CASE NUMBER \_\_\_\_\_

COMPANY \_\_\_\_\_ ADDRESS \_\_\_\_\_

DEPARTMENT \_\_\_\_\_ LOCATION (if different from mailing address) \_\_\_\_\_

1. NAME of INJURED		2. SOCIAL SECURITY NUMBER		3. SEX <input type="checkbox"/> M <input type="checkbox"/> F	4. AGE	5. DATE of ACCID
6. HOME ADDRESS		7. EMPLOYEE'S USUAL OCCUPATION		8. OCCUPATION at TIME of ACCIDENT		
9. EMPLOYMENT CATEGORY <input type="checkbox"/> Regular, full-time <input type="checkbox"/> Temporary <input type="checkbox"/> Nonemployee <input type="checkbox"/> Regular, part-time <input type="checkbox"/> Seasonal		10. LENGTH of EMPLOYMENT <input type="checkbox"/> Less than 1 mo. <input type="checkbox"/> 5 mos. to 5 yrs. <input type="checkbox"/> 1-5 mos. <input type="checkbox"/> More than 5 yrs.		11. TIME in OCCUP at TIME of ACCID <input type="checkbox"/> Less than 1 mo. <input type="checkbox"/> 6 mos. <input type="checkbox"/> 1-5 mos. <input type="checkbox"/> More than 6 mos.		
12. NATURE of INJURY and PART of BODY		13. CASE NUMBERS and NAMES of OTHERS INJURED in SAME ACCIDENT				
14. NAME and ADDRESS of PHYSICIAN		15. TIME of INJURY A. _____ A.M. P.M. 3. Time within shift C. Type of shift		16. SEVERITY of INJURY <input type="checkbox"/> Fatality <input type="checkbox"/> Lost workdays—days away from <input type="checkbox"/> Lost workdays—days of restricted <input type="checkbox"/> Medical treatment <input type="checkbox"/> First aid <input type="checkbox"/> Other, specify _____		
17. NAME and ADDRESS of HOSPITAL		18. SPECIFIC LOCATION of ACCIDENT ON EMPLOYER'S PREMISES? <input type="checkbox"/> Yes <input type="checkbox"/> No				
19. PHASE OF EMPLOYEE'S WORKDAY at TIME of INJURY <input type="checkbox"/> During rest period <input type="checkbox"/> Entering or leaving plant <input type="checkbox"/> During meal period <input type="checkbox"/> Performing work duties <input type="checkbox"/> Working overtime. <input type="checkbox"/> Other _____		20. DESCRIBE HOW the ACCIDENT OCCURRED				
21. ACCIDENT SEQUENCE. Describe in reverse order of occurrence events preceding the injury and accident. Starting with the injury and moving backward in time, reconstruct the sequence of events that led to the injury. A. Injury Event _____ B. Accident Event _____ C. Preceding Event #1 _____ D. Preceding Event #2, #3, etc. _____						





ATTACHMENT G  
DAILY SITE SAFETY AND HEALTH  
ACTIVITY REPORT

Site: \_\_\_\_\_

Location: \_\_\_\_\_

EA Site Personnel

Subcontractors, Visitors, Others

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Site Operation(s)

Level of PPE (initial/changes)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Onsite Hours (from/to): \_\_\_\_\_

Monitoring Instruments Used (attach Environmental Monitoring Record): \_\_\_\_\_

Site Safety and Health Plan  
Violations

Corrective Action  
Specified

Corrective Action  
Taken (yes/no)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
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Observations and Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

ATTACHMENT F  
MATERIAL SAFETY DATA SHEETS (MSDS'S)  
FOR SAMPLE FIXATIVES AND DECONTAMINATION CHEMICALS

# MALLINCKRODT

## Material Safety Data Sheet

Mallinckrodt, Inc. Science Products Division, P.O. Box M Paris, KY 40361

### ACETONE

#### PRODUCT IDENTIFICATION:

Synonyms: Dimethylketone; 2-propanone

Formula CAS No.: 67-64-1

Molecular Weight: 58.08

Chemical Formula:  $\text{CH}_3\text{COCH}_3$

Hazardous Ingredients: Acetone

#### PRECAUTIONARY MEASURES

DANGER! EXTREMELY FLAMMABLE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION.

Keep away from heat, sparks and flame.  
Avoid contact with eyes, skin and clothing.  
Keep container closed.  
Use with adequate ventilation.  
Avoid breathing vapor.

#### EMERGENCY/FIRST AID

If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. In all cases call a physician.  
SEE SECTION 5.

DOT Hazard Class: Flammable Liquid

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WARRANTIES, EITHER EXPRESS OR IMPLIED, OF

#### SECTION 1 Physical Data

Appearance: Clear, colorless, volatile liquid.

Odor: Fragrant, mint-like

Solubility: Miscible in all proportions in water.

Boiling Point:  $56.5^\circ\text{C}$  ( $133.7^\circ\text{F}$ )

Melting Point:  $-95^\circ\text{C}$  ( $-139^\circ\text{F}$ )

Specific Gravity: 0.8

Vapor Density (Air=1): 2.0

Vapor Pressure (mm Hg): 400 @  $39.5^\circ\text{C}$  ( $103^\circ\text{F}$ )

Evaporation Rate: (Butyl Acetate = 1) ca. 7.7

#### SECTION 2 Fire and Explosion Information

Fire:

Flammable liquid!

Flash point:  $-18^\circ\text{C}$  ( $0^\circ\text{F}$ ) closed cup

Autoignition temperature:  $465^\circ\text{C}$  ( $869^\circ\text{F}$ )

Flammable limits in air, % by volume:  
lcl: 2.6 ucl: 12.8

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above.

Fire Extinguishing Media:

Water, dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR TO THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Emergency Telephone Number: 314-982-5000

#### SECTION 3 Reactivity Data

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Oxidizing materials, chloroform, alkalis, acids, potassium t-butoxide.

#### SECTION 4 Leak/Spill Disposal Information

Isolate or enclose the area of the leak or spill. Remove all sources of ignition. Clean-up personnel require protective clothing and respiratory protection from vapors. Contain and recover liquid for reclamation when possible. Larger spills and lot sizes can be collected as hazardous waste and atomized in a suitable RCRA approved combustion chamber, or absorbed with vermiculite, dry sand, earth or similar material for disposal as hazardous waste in a RCRA approved facility. Do not flush to sewer!

Reportable Quantity (RQ)(CWA/CERCLA): 5000 lbs.

Ensure compliance with local, state and federal regulations.

NFPA Ratings: Health: 1 Flammability: 3 Reactivity: 0

... .. on September 00.05.85

ACETONE

AD

## SECTION 5 Health Hazard Information

### A. EXPOSURE / HEALTH EFFECTS

#### Inhalation:

Irritating to the nose, throat, and mucous membranes. May cause dizziness, dullness, and headache. Narcotic in high concentrations.

#### Ingestion:

May produce narcotic effects with other symptoms paralleling those from inhalation exposure.

#### Skin Contact:

Irritating due to defatting action on skin. May cause redness, pain, drying and cracking of the skin.

#### Eye Contact:

Vapors are irritating to the eyes. Splashes may cause severe irritation, with redness and pain.

#### Chronic Exposure:

Prolonged or repeated skin contact may produce severe irritation or dermatitis.

#### Aggravation of Pre-existing Conditions:

Use of alcoholic beverages enhances toxic effects.

### B. FIRST AID

#### Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

#### Ingestion:

If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person. Call physician immediately.

#### Skin Exposure:

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

#### Eye Exposure:

Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

### C. TOXICITY DATA

(RTECS, 1986)

Oral rat LD50: 9750 mg/kg Skin rabbit LD50: 20

gm/kg Mutation references cited. Irritation eye rabbit 3.95 mg Severe Aquatic toxicity rating: TLM96: over 1000 ppm

### SECTION 6 Occupational Control Measures

#### Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):  
750 ppm (TWA), 1000 ppm (STEL)

-ACGIH Threshold Limit Value (TLV):  
750 ppm (TWA), 1000 ppm (STEL)

### Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

#### Personal Respirators:

(NIOSH Approved)

If the TLV is exceeded a full facepiece chemical cartridge respirator may be worn, in general, up to the maximum use concentration specified by the respirator supplier. Alternatively, a supplied air full facepiece respirator or airlined hood may be worn.

#### Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls to prevent skin contact.

#### Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

### SECTION 7 Storage and Special Information

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from oxidizing materials. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment.

..... ACCET

# MALLINCKRODT

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### Addendum to Material Safety Data Sheet

#### REGULATORY STATUS

This Addendum Must Not Be

Detached from the MSDS

Identifies SARA 313 substance(s)

Any copying or redistribution of the MSDS

must include a copy of this addendum

(Chem.Key: ACCET)

Hazard Categories for SARA  
Section 311/312 Reporting  
Acute Chronic Fire Pressure Reactive  
----- X ----- X

Product or Components  
of Product:

ACETONE (67-64-1)

SARA EHS Sect. 302 RQ (lbs.)	TPQ (lbs.)	SARA Section 313 Chemicals Name List	Chemical Category	CERCLA Sec.103 RQ (lbs.)	RCRA Sec. 261.33
No	No	Yes	No	5000	U002

SARA Section 302 EHS RQ: Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355.  
SARA Section 302 EHS TPQ: Threshold Planning Quantity of Extremely Hazardous Substance. An asterisk (\*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.  
SARA Section 313 Chemicals: Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.  
CERCLA Sec. 103: Comprehensive Environmental Response, Compensation and Liability Act (Superfund). Releases to air, land or water of these hazardous substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4  
RCRA: Resource Conservation and Reclamation Act. Commercial chemical product wastes designated as acute hazards and toxic under 40 CFR 261.33

ACETONE

# Material Safety Data Sheet

Required under USDL Safety and Health Regulations  
for Shipyard Employment (29 CFR 1915)

ALLINUX POWDER DETERGENT  
U.S. Department of Labor  
Occupational Safety and Health Administration 04-572-4



QMB No. 1218-0074  
Expiration Date 05/31/86

PREPARED 1/2/85

## Section I

Manufacturer's Name

ALCONOX, INC.

Emergency Telephone Number

(212) 473-1300

Address (Number, Street, City, State, and ZIP Code)

215 PARK AVENUE SOUTH

Chemical Name  
and Synonyms

N.A.

Trade Name  
and Synonyms

ALCONOX

NEW YORK, N.Y. 10003

Chemical  
Family

ANIONIC DETERGENT N.A.

Formula

N.A.

## Section II - Hazardous Ingredients

Paints, Preservatives, and Solvents

% TLV (Units) Alloys and Metallic Coatings

% TLV (Units)

Pigments

NONE

Base Metal

NONE

Catalyst

NONE

Alloys

NONE

Vehicle

NONE

Metallic Coatings

NONE

Solvents

NONE

Filler Metal  
Plus Coating or Core Flux

NONE

Additives

NONE

Others

NONE

Others

NONE

Hazardous Mixtures of Other Liquids, Solids or Gases

NONE

% TLV (Units)

## Section III - Physical Data

Boiling Point (°F)

N.A.

Specific Gravity (H<sub>2</sub>O=1)

N.A.

Vapor Pressure (mm Hg.)

N.A.

Percent Volatile by Volume (%)

N.A.

Vapor Density (AIR=1)

N.A.

Evaporation Rate

N.A.

Solubility in Water

APPRECIABLE

Appearance and Odor

WHITE POWDER INTERSPERSED WITH CREAM COLORED FLAKES - ODORLESS

## Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)

NONE

Flammable Limits

N.A.

Let

N.A.

Uet

N.A.

Extinguishing Media

WATER, CO<sub>2</sub>, DRY CHEMICAL, FOAM, SAND/EARTH

Special Fire Fighting Procedures

FOR FIRES INVOLVING THIS MATERIAL, DO NOT ENTER WITHOUT

PROTECTIVE EQUIPMENT AND SELF CONTAINED BREATHING APPARATUS

Unusual Fire and Explosion Hazards

NONE

Section V - Health Hazard Data

Threshold Limit Value

NO DATA AVAILABLE - TREAT AS NUISANCE DUST

ALCOX Powder  
04-377-4  
04-377-58, 59, 60

Effects of Overexposure

PROLONGED EXPOSURE TO DUST MAY IRRITATE MUCOUS MEMBRANES

Emergency First Aid Procedures

EYES - FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SKIN-FLUSH WITH PLENTY OF WATER. INGESTION - DRINK LARGE QUANTITIES OF WATER TO DILUTE MATERIAL. GET MEDICAL ATTENTION FOR DISCOMFORT.

Section VI - Reactivity Data

Stability	Unstable	Conditions to Avoid	NONE
	Stable X		

Incompatibility (Materials to Avoid)

AVOID STRONG ACIDS

Hazardous Decomposition Products

MAY RELEASE CO<sub>2</sub> GAS ON BURNING

Hazardous Polymerization	May Occur	Conditions to Avoid	NONE
	Will Not Occur X		

Section VII - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled

MATERIAL FOAMS PROFUSELY, SHOVEL AND RECOVER

AS MUCH AS POSSIBLE, RINSE REMAINDER TO SEWER. MATERIAL IS COMPLETELY BIODEGRADABLE.

Waste Disposal Method

SMALL QUANTITIES MAY BE DISPOSED OF IN SEWER. LARGE QUANTITIES SHOULD BE DISPOSED OF ACCORDING TO LOCAL REQUIREMENTS FOR NON-HAZARDOUS DETERGENT

Section VIII - Special Protection Information

Respiratory Protection: Specify Type

DUST MASK

Ventilation	Local Exhaust	Special	N.A.
	NORMAL		
	Mechanical (General)	Other	N.A.
	N.A.		

Protective Gloves

USEFUL - NOT REQUIRED

Eye Protection

USEFUL - NOT REQUIRED

Other Protective Equipment

NOT REQUIRED

Section IX - Special Precautions

Precautions to be Taken in Handling and Storing

SHOULD BE STORED IN A DRY AREA TO

PREVENT CAKING

Other Precautions

NO SPECIAL REQUIREMENTS OTHER THAN THE GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES EMPLOYED WITH ANY INDUSTRIAL CHEMICAL.

# MALLINCKRODT

## Material Safety Data Sheet

Mallinckrodt, Inc. Science Products Division, P.O. Box M Paris, KY 40361

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Emergency Telephone Number: 314-982-5000

### HYDROCHLORIC ACID (LESS THAN 4%)

#### PRODUCT IDENTIFICATION:

Synonyms: Muriatic acid solution; Hydrochloric acid volumetric solutions 0.01 Normal, 0.02 Normal, 0.2 Normal, 0.1 Normal, 0.5 Normal, 1.0 Normal

Formula CAS No.: 7647-01-0

Molecular Weight: 36.46

Chemical Formula: HCl

Hazardous Ingredients: Hydrochloric acid

#### PRECAUTIONARY MEASURES

WARNING! MAY CAUSE IRRITATION.

Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

#### EMERGENCY/FIRST AID

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. SEE SECTION 5.

DOT Hazard Class: Corrosive Material  
Solutions 0.1 Normal and above: Corrosive Material.  
Solutions less than 0.1 Normal: Not Regulated.

#### SECTION 1 Physical Data

Appearance: Clear, colorless solution.

Odor: Slight hydrogen chloride odor.

Solubility: Infinitely soluble in water.

Boiling Point: ca. 100°C (212°F)

Melting Point: ca. 0°C (32°F)

Specific Gravity: ca. 1

Vapor Density (Air=1): Essentially the same as water.

Vapor Pressure (mm Hg): Essentially the same as water.

Evaporation Rate: Essentially the same as water.

#### SECTION 2 Fire and Explosion Information

Fire:

Not considered to be a fire hazard.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

#### SECTION 3 Reactivity Data

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Emits toxic fumes of chlorine when heated to decomposition.

Hazardous Polymerization:

This substance does not polymerize.

Incompatibilities:

No incompatibility data found.

#### SECTION 4 Leak/Spill Disposal Information

Cover spill with sodium bicarbonate or soda ash and mix. Let stand for a short time to complete the neutralization. Neutralized waste may be transferred to a closed, preferably metal, container and sent to an approved waste disposal facility. Wash spill area with soda ash solution and flush with plenty of water. Reportable Quantity (RQ)(CWA/CERCLA): 5000 lbs. Hydrochloric Acid.

Ensure compliance with local, state and federal regulations.



**SECTION 5 Health Hazard Information**

**A. EXPOSURE / HEALTH EFFECTS**

**Inhalation:**

Symptoms are expected to be less severe than exposure to higher concentrations of hydrochloric acid, where symptoms may include irritation to the respiratory tract.

**Ingestion:**

Symptoms are expected to be less severe than exposure to higher concentrations of hydrochloric acid, where symptoms may include burning sensation, vomiting and diarrhea.

**Skin Contact:**

Symptoms are expected to be less severe than exposure to higher concentrations of hydrochloric acid, where symptoms may include irritation, redness, pain and burns.

**Eye Contact:**

Splashes may cause irritation. Symptoms are expected to be less severe than exposure to higher concentrations of hydrochloric acid, where symptoms may include severe burns and eye damage.

**Chronic Exposure:**

No information found.

**Aggravation of Pre-existing Conditions:**

No information found.

**B. FIRST AID**

**Inhalation:**

Remove to fresh air. Get medical attention for any breathing difficulty.

**Ingestion:**

Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.

**Skin Exposure:**

Wash exposed area with soap and water. Get medical advice if irritation develops.

**Eye Exposure:**

Wash thoroughly with running water. Get medical advice if irritation develops.

**C. TOXICITY DATA (RTECS, 1986)**

Mutation references cited (Hydrochloric acid).

**SECTION 6 Occupational Control Measures**

**Airborne Exposure Limits:**

-OSHA Permissible Exposure Limit (PEL):

Hydrochloric acid: 5 ppm Ceiling

-ACGIH Threshold Limit Value (TLV):

Hydrochloric acid: 5 ppm Ceiling

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

**Personal Respirators: (NIOSH Approved)**

If the TLV is exceeded, a dust/mist respirator may be worn up to ten times the TLV. Consult respirator supplier for details.

**Skin Protection:**

Wear protective gloves and clean body-covering clothing.

**Eye Protection:**

Use chemical safety goggles. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

**SECTION 7 Storage and Special Information**

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage.

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HYC11

# MALLINCKRODT

## Material Safety Data Sheet

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Emergency Telephone Number: 314-982-5000

### Addendum to Material Safety Data Sheet

#### REGULATORY STATUS

##### This Addendum Must Not Be

##### Detached from the MSDS

##### Identifies SARA 313 substance(s)

##### Any copying or redistribution of the MSDS

##### must include a copy of this addendum

(Chem.Key: HYCID)

Hazard Categories for SARA  
Section 311/312 Reporting  
Acute Chronic Fire Pressure Reactive  
-----  
X

##### Product or Components of Product:

HYDROCHLORIC ACID (LESS THAN 4%) codes: H148  
H156 H163 2853 H162 6388 The following  
percentages correspond one to one with the  
product codes given here.

Hydrogen chloride (7647-01-0) 0.04%, 0.07%, 0.73%, 0.36%,  
1.8%, 3.6%

SARA EHS Sect. 302 RQ (lbs.)	TPQ (lbs.)	SARA Section 313 Chemicals Name List	Chemical Category	CERCLA Sec.103 RQ (lbs.)	RCRA Sec. 261.33
---------------------------------	------------	---	-------------------	-----------------------------	---------------------

1	500gas	Yes	No	5000 (HCl acid)	No
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SARA Section 302 EHS RQ: Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355.  
SARA Section 302 EHS TPQ: Threshold Planning Quantity of Extremely Hazardous Substance. An asterisk (\*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.  
SARA Section 313 Chemicals: Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.  
CERCLA Sec. 103: Comprehensive Environmental Response, Compensation and Liability Act (Superfund). Releases to air, land or water of these hazardous substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4  
RCRA: Resource Conservation and Reclamation Act. Commercial chemical product wastes designated as acute hazards and toxic under 40 CFR 261.33

Effective Date: 04-06-89 Supersedes 10-21-86

HYDROCHLORIC ACID (LESS THAN 4%)

# MALLINCKRODT

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Emergency Telephone Number: 314-982-5000

### NITRIC ACID 0.02 N and 0.1 N VOLUMETRIC SOLUTIONS

#### PRODUCT IDENTIFICATION:

Synonyms: Azotic acid solutions; nitric acid solutions, less than 1%

Formula CAS No.: 7697-37-2

Molecular Weight: 63.00

Chemical Formula:  $\text{HNO}_3$

Hazardous Ingredients:  
Not applicable. (Nitric Acid less than 1%)

#### PRECAUTIONARY MEASURES

As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.

#### EMERGENCY/FIRST AID

SEE SECTION 5.

DOT Hazard Class: Not Regulated

#### SECTION 1 Physical Data

Appearance: Clear, colorless liquid.

Odor: Slightly acid.

Solubility: Infinite in water.

Boiling Point: No information found.

Melting Point: No information found.

Specific Gravity: No information found.

Vapor Density (Air = 1): No information found.

Vapor Pressure (mm Hg): No information found.

Evaporation Rate: No information found.

#### SECTION 2 Fire and Explosion Information

Fire:

Not considered to be a fire hazard.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

If involved in a fire, use water spray.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

#### SECTION 3 Reactivity Data

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.

#### SECTION 4 Leak/Spill Disposal Information

Small Spills: Flush with water and neutralize with alkaline material (soda ash, lime, etc.). Sewer with excess water.

Larger spills and lot sizes: Neutralize with alkaline material, pick up with absorbent material (sand, earth, vermiculite) and dispose in a RCRA-approved waste facility or sewer the neutralized slurry with excess water if local ordinances allow. Provide forced ventilation to dissipate fumes. Reportable

Quantity (RQ) (CWA/CERCLA): 1000 lbs. Nitric acid

Ensure compliance with local, state and federal regulations.

**SECTION 5 Health Hazard Information****A. EXPOSURE / HEALTH EFFECTS****Inhalation:**

No adverse health effects expected from inhalation of dilute nitric acid solutions less than one percent.

**Ingestion:**

No adverse health effects expected from ingestion of dilute nitric acid solutions less than one percent.

**Skin Contact:**

No adverse health effects expected from skin contact of dilute nitric acid solutions less than one percent.

**Eye Contact:**

May cause irritation with pain and redness.

**Chronic Exposure:**

No information found.

**Aggravation of Pre-existing Conditions:**

No information found.

**B. FIRST AID****Inhalation:**

Remove to fresh air. Get medical attention for any breathing difficulty.

**Ingestion:**

If large amounts were swallowed, give water to drink and get medical advice.

**Skin Exposure:**

Wash exposed area with soap and water. Get medical advice if irritation develops.

**Eye Exposure:**

Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**C. TOXICITY DATA**

(RTECS, 1986)

Nitric acid: Inhalation (Rat) LCS0: 244 ppm  
(NO<sub>2</sub>)/30M

**SECTION 6 Occupational Control Measures****Airborne Exposure Limits:****For Nitric Acid:**

-OSHA Permissible Exposure Limit (PEL):  
2 ppm (TWA), 4 ppm (STEL)

-ACGIH Threshold Limit Value (TLV):  
2 ppm (TWA), 4 ppm (STEL)

**Ventilation System:**

Not expected to require any special ventilation but mists should be controlled.

**Personal Respirators: (NIOSH Approved)**

Not expected to require personal respirator usage, however, if the TLV is exceeded, a half-mask air-purifying respirator equipped with a high-efficiency filter, or any half-mask supplied air respirator may be worn up to concentrations of 100 ug per cubic meter. See OSHA Standard for additional information.

**Skin Protection:**

Gloves and lab coat, apron or coveralls.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

**SECTION 7 Storage and Special Information**

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances.

.....  
NITRV

# MALLINCKRODT

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Emergency Telephone Number: 314-982-5000

### Addendum to Material Safety Data Sheet

#### REGULATORY STATUS

This Addendum Must Not Be

Detached from the MSDS

Identifies SARA 313 substance(s)

Any copying or redistribution of the MSDS

must include a copy of this addendum

(Chem.Key: NITRV)

Hazard Categories for SARA  
Section 311/312 Reporting  
Acute Chronic Fire Pressure Reactive  
-----

Product or Components  
of Product:

NITRIC ACID 0.02 N and 0.1 N VOLUMETRIC  
SOLUTIONS

Nitric acid (7697-37-2) 0.12% and 0.63%

SARA EHS Sect. 302 RQ (lbs.)	TPQ (lbs.)	SARA Section 313 Chemicals Name List	Chemical Category	CERCLA Sec.103 RQ (lbs.)	RCRA Sec. 261.33
1000	1,000	Yes	No	1000	No

SARA Section 302 EHS RQ: Reportable Quantity of Extremely Hazardous Substance, listed at 40 CFR 355.  
SARA Section 302 EHS TPQ: Threshold Planning Quantity of Extremely Hazardous Substance. An asterisk (\*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.  
SARA Section 313 Chemicals: Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.  
CERCLA Sec. 103: Comprehensive Environmental Response, Compensation and Liability Act (Superfund). Releases to air, land or water of these hazardous substances which exceed the Reportable Quantity (RQ) must be reported to the National Response Center, (800-424-8802); Listed at 40 CFR 302.4  
RCRA: Resource Conservation and Reclamation Act. Commercial chemical product wastes designated as acute hazards and toxic under 40 CFR 261.33

Effective Date: 04-06-89 Supersedes 08-08-86

NITRIC ACID 0.02 N and 0.1 N VOLUMETRIC SOLUTIONS

ATTACHMENT H

UXO CLEARANCE SITE WORK/SAFETY PLAN  
FORT GEORGE G. MEADE

MONITORING WELL UXO CLEARANCE  
FORT GEORGE G. MEADE, MARYLAND  
WORK/SAFETY PLAN

\*\*\*\*\*WARNING\*\*\*\*\*

UXO contractor personnel will not perform any Explosive Ordnance Disposal (EOD), render safe or disposal procedures on items of ordnance known or thought to contain military chemical agents.

Contact USATHAMA Health and Safety Office at (301) 671-4811 or Autovon at 584 4811

\*\*\*\*\*WARNING\*\*\*\*\*

Unexploded Ordnance may detonate when subjected to heat, shock or friction. Movement of item may cause functioning

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## INTRODUCTION

Field investigation activities at Fort Meade will be conducted in areas where historical records review indicate the possible use of ordnance and or chemical munitions. Site contractor personnel performing various activities including installation of monitoring wells, soil gas studies, and sampling may encounter unexploded ordnance (UXO's). Unexploded ordnance can contain explosives or pyrotechnic fillers.

Of paramount concern is that the proper procedures are followed when contact with a UXO is confirmed. The following sections discuss the procedures for UXO operations, the response procedures of field teams and personnel when UXO's are suspected or detected.

1.0 CONVENTIONAL UNEXPLODED ORDNANCE

1.1 ON-SITE RESPONSE TO SUSPECTED\DETECTED ORDNANCE

1. Upon detection of Unexploded Ordnance (UXO) on the surface or near subsurface, non - UXO personnel will evacuate upwind to the designated safe area.
2. The command post (CP) will be notified by radio of the presence of a suspect UXO location by all field personnel who may discover one. The EA Site Safety and Health Supervisor (SSHS) in the CP will establish positive communications with the UXO team prior to Explosive Ordnance Reconnaissance (EOR) and Hazard Assessment (HA).
3. The UXO Safety Officer (SO) will respond to the site and maintain visual surveillance and communications upwind of the primary UXO technician during EOR and HA. The safe separation distance for the SO from the primary technician in order to protect against fragmentation, and blast with available cover is a minimum of 25 feet.
4. Information pertaining to the suspect UXO will be recorded and transmitted to the CP. If identification of the UXO is determined to be hazardous no further action by the UXO technician will be taken. The identification of the UXO will be relayed to the site Command Post (CP) and the location plotted. The UXO location will be flagged and area clearly marked to aid government EOD personnel returning to the location for final disposition of the item. Explosive Ordnance Reconnaissance (EOR) information and the items hazard assessment will be recorded and entered in to the field log, information pertaining to each individual UXO will be forwarded to the cognizant EOD unit as required.

5. The cognizant US Army Explosive Ordnance Disposal (EOD) Unit, is:  
144th Explosive Ordnance Disposal Unit;  
Fort George G. Meade, Maryland  
Bldg. # 2231, Meade.  
Duty Hrs: 0800 - 1630,  
Phone: (301) 677-5770,  
POC: Lt. Tejan
6. If the item should be suspected to be a chemical agent munition based on EOR, the item location will be radioed to the CP, the UXO team will flag the item location from an upwind position and withdraw up wind to a safe area and prepare for personnel decontamination and egress from the temporary established hot zone.  
The EA SSHS or UXB SO in the CP will inform the USATHAMA Health and Safety Office of the location of the suspected chemical munition.  
Operations will halt for the site until guidance from the USATHAMA Health and Safety Office is obtained.

## 1.2 SPECIFIC OPERATIONS

### 1.2.1 Pre-Operation.

Each morning, all personnel will report to the CP at the time designated by the EA SSHS. All personnel will be briefed on weather and wind conditions for the day by the EA SSHS.

(1) UXB will designate the location of the CP upwind of the work area. The CP will always be upwind of a work area and will relocate if necessary or as determined by wind direction and the EA SSHO or UXB SO.

(2) UXB will give a UXO safety briefing and summary of EOR

hazard assessments encountered from the prior day's activities. UXB SO will brief specific instructions for the day's work based on the individual tasks to be preformed. Radios will be issued by the UXB SO prior to daily site operations. Communication checks with team leaders will be accomplished at that time.

(3) All additional personnel not actively involved in the site operation will remain on alert and stationed at the designated field CP. Persons wishing to proceed to the on-site operations will obtain permission from the EA SSHS or UXB SO and will be required to be in full compliance with 29 CFR 1910.120, only then can they be escorted to an operations area. While on-site, the "buddy system" will be in effect and observed by all personnel.

(4) UXB SO will:

a) Record and maintain a daily log of all UXO site operations.

b) Establish communications with Range Control, EOD and Base Fire Department each morning.

c) Ensure personnel know the location of the CP, emergency equipment and phone lists at all times.

#### 1.2.2 UXO EOR Operations

(1) Operations will commence no earlier than sunrise daily.

(2) Personnel will assume the UXO sweep formation for survey as directed by the UXO SO.

(3) Area Sweep Operation will commence on the order of UXB SO.

- (4) Operations will halt at the direction of the EA SSHO, or UXB SO for non-routine situations.
- (5) Operations will halt if communication is lost with Fire Department or if the ambulance departs from the installation. Operations will halt if anyone involved with UXO sweep operations observes an unsafe act or a safety violation.
- (6) Personnel unnecessary to the operation will not be permitted in the immediate site operational area.
- (7) The minimum number of personnel engaged in UXO escort operations or UXO EOR operations will be TWO. No individual will be permitted alone or unobserved in a suspect UXO or target impact area. Both individuals will be in visual contact and have full and equal knowledge of an operation being performed.

#### 1.2.3 Handling of Suspect Items.

Suspect items encountered require safe removal and a final disposition based on hazard assessment.

- (1) Upon sighting a suspect UXO, the sighter will immediately sound a verbal warning and the sweep line will come to an immediate halt.
- (2) No unauthorized personnel will touch or move any suspect item.
- (3) If a suspected chemical/UXO is discovered, sweep personnel will sound a verbal alarm, and retreat a minimum of 10 meters (30 feet) upwind or the approximate fragmentation distance as determined by the UXO technician.

(4) One UXO technician and one UXO safety observer will investigate the item.

(5) The location of the items will be marked with a flag by the UXB SO for identification/disposition. Suspected Chemical Surety Items (SCSI) will not be left unattended. USATHAMA H&SO will be notified. Government EOD will respond and SCSI will be taken over by Government EOD or authorized agent of the base commander personnel, designated to identify and effect disposition.

(6) Disposition of conventional UXO's marked will be made at the end of each working day, with the exception of emergency situations which will be handled as they arise. UXO item locations and EOR information will be given to the cognizant EOD unit by the UXB SO.

#### 1.2.4. Examination of suspect item.

Suspect UXO items will be examined visually for identification, ie: nomenclature, painting and markings, intact safety pins and leakage of fillers, (explosive or pyrotechnic).

#### 1.2.5 Hazard Zone Evaluation

The Maximum Credible Event (MCE) is the event that is likely to occur from a given quantity and disposition of ammunition, explosive or chemical agent.

(1) The Maximum Credible Event (MCE) for items suspected or known to contain explosives will be detonation of the worst single case explosive laden chemical round.

(2) The MCE for Fort Meade, Maryland (FMM) is still to be identified, at this time.

(3) MCE for those items not containing explosives will be the spill of the total contents.

(4) In the event munitions are found, the MCE will be

adjusted.

(5) Operations will be curtailed when wind conditions may cause the general public to fall within the no effects distance if the MCE should occur.

#### 1.2.6 Termination of Daily Operations

UXO sweep operations will be terminated each day at a time that will allow the disposition of all discovered items prior to sunset.

(a) Upon completing a days operations, all personnel will turn in equipment at a designated turn-in point. Radios will be returned to the CP.

(b) UXB will notify Range control, EOR, and the Fire Department of completion of operations for the day, who in turn will notify all other appropriate agencies.

(c) Before release of personnel, the EA SSHS will conduct a debriefing of the day's events, if necessary.

#### 2.0 HAZARD ASSESSMENT OPTIONS

1. Small arms and training explosives, i.e., 7.62 blank, artillery simulators, booby trap simulators, flares and smokes will be collected by UXB and relocated to a secure storage area for turn in to Government EOD.
2. Pyrotechnics will be inspected and collected by the UXO team, then relocated to a secured area. Ordnance items that are determined expended, or have functioned as designed and are assessed as "SAFE" to relocate will be removed from the drilling areas by UXB and secured.
3. Ordnance items that are determined to be practice or inert training rounds will be relocated to a secure holding area.

4. Ordnance Items that are "Dud Fired" and fusing is determined to be inoperable or without secondary fusing will be marked and avoided by all field personnel until routine pick up by government EOD.
5. Ordnance items marked as "suspect Live" will not be moved. The item is to be flagged and turned over to government EOD for further actions.
6. Ordnance items marked as "suspect" but with out visible fusing, that impede field progress due to its location will be removed remotely from the area by the UXB senior EOD technician to a safe area that will not impede drilling operations.
7. Ordnance items that are "LIVE" will not be moved. Location will be marked on a site map and new drill location will be selected. Government EOD will be notified.

### 3.0 CHEMICAL AGENTS or CHEMICAL MUNITIONS

#### \*\*\*\*\*WARNING\*\*\*\*\*

UXO contractor personnel will not perform any Explosive Ordnance Disposal (EOD) render safe or Disposal procedures on items of ordnance known or thought to contain military chemical agents

Contact USATHAMA, Health and Safety Office  
(301) 671-4811 or Autovon 584-4811

### 3.1 SAFETY REQUIREMENTS

Historical records indicate the past use of chemical munitions on parts of Fort Meade. Therefore, the following Safety Requirements will be followed and practiced.

Site personnel (EA or UXB) will not be assigned to any Suspected Chemical Operation Area.



1. Workers who are to be assigned to participate in invasive operations at selected locations at former landfill sites 2 and 3 are to be given a medical examination in accordance with IAW AMC-R 385-131, dated 9 October 1987. The preassignment medical examination will include blood cholinesterase tests in accordance with current policy to establish a baseline level. Each worker will be given a medical examination at least annually and at any other occasion when the medical authority deems it advisable. An examination will also be given at the time a person is permanently separated from these operations.
2. Other personnel and visitors who have a need to monitor or inspect recovery operations will establish a baseline cholinesterase level and have a record of it on file at the EA Health and Safety Office or other contract medical monitoring program. This will be completed prior to visiting the site investigation areas.
3. Cholinesterase determinations will be required as part of the physical examination should exposure to military compounds be encountered during operations at FMM. Follow-up examinations of plasma and RBC cholinesterase content will be performed at the discretion of the EA Occupational Physician.
4. Prior to assignment to, all personnel will be thoroughly briefed by the UXB chemical safety officer in the signs and symptoms of chemical exposure and will be instructed in first aid and self-aid techniques for exposure to the various substances.
5. All personnel involved in site operations at Ft. George G. Meade will have access to the work and home telephone number of the EA Corporate Safety and Health Officer to which

suspect exposures can be reported.

6. Any illness or sickness will be reported by the individual to the EA SSHS prior to the start of daily operations or before leaving the job, if the illness occurs during working hours.
7. Individuals requiring entrance to operations areas having any cuts or abrasions on their person will inform the EA SSHS. These individuals will be referred to qualified medical personnel, prior to being permitted in a suspect hazardous operating area, for assurance the cuts or abrasions are properly covered to the satisfaction of medical personnel.
8. All protective clothing worn by individuals or used during the operation will be serviceable and wear dated.

### 3.2 SPECIFIC FIRST AID FOR MUSTARDS

1. Flush eyes and face with copious amounts of fresh water. Blot contamination from the skin - do not rub or scrub.
2. Remove the person from the source of the contamination and flush the skin and clothes with a 5% Sodium Hypochlorite solution, to be supplied by UXB, within one minute of exposure. Remove the contaminated clothing. Flush the skin again with a 5% Sodium Hypochlorite solution. Wash contaminated skin with soap and water.
3. The Fort Meade, Maryland Post Fire Department will evacuate the casualty to the nearest medical facility. The Command Post will notify the Kimbrough Army Hospital Emergency Room of the incoming casualty.

### 3.3 KNOWN CHEMICAL AGENTS

\*\*\*\*\*WARNING\*\*\*\*\*

UXO contractor personnel will not perform any Explosive Ordnance Disposal (EOD) render safe or disposal procedures on items of ordnance known or thought to contain military chemical agents.

Contact USATHAMA, Health and Safety Office  
(301) 671-4811 or Autovon 584-4811

\*\*\*\*\*WARNING\*\*\*\*\*

Upon confirmation of a chemical agent round the UXO safety officer will notify the Command post to contact the USATHAMA Health and Safety Office and request support.

If a known exposure has occurred, the UXO team will immediately notify the command post of the situation and evacuate the area. On site personnel will proceed to the upwind safety zone where first aid treatment and decontamination of the injured will be accomplished.

All potentially contaminated clothing will be decontaminated and secured in plastic bags then containerized for collection and disposal by Ft. Meade personnel.

Operations will not continue in the area until authorized by the USATHAMA Safety Office.

### 3.4 CONTRACTOR      COMMAND      POST      PERSONNEL      RESPONSE      TO SUSPECTED/DETECTED AGENTS

Command Post personnel will be in constant radio contact with on site personnel. Command Post personnel will be ready at all times to respond to situations when bulk chemicals and/or chemical UXO are suspected/detected. After receiving the message that the item is suspected to be

chemical, a complete hazard assessment will be conducted by the UXO SO. If the item is determined to be a possible chemical surety risk, UXB will respond as follows:

\*\*\*\*\*WARNING\*\*\*\*\*

UXO contractor personnel will not perform any Explosive Ordnance Disposal (EOD) render safe or disposal procedures on items of ordnance known or thought to contain military chemical agents.

Contact USATHAMA, Health and Safety Office  
(301) 671-4811 or Autovon 584-4811

\*\*\*\*\*WARNING\*\*\*\*\*

Notify by radio the EA SSHA at the CP, that chemicals and/or UXO chemical munitions have been detected, Command Post personnel must act quickly and efficiently to contact the following agency.

\*\*\*\*\*WARNING\*\*\*\*\*

Contact USATHAMA, Health and Safety Office  
(301) 671-4811 or Autovon 584-4811

\*\*\*\*\*WARNING\*\*\*\*\*

After gathering the information from the UXO field team, the command post will:

1. Notify the Base Fire Department personnel of the Chemical/UXO incident giving exact location of personnel and as much detail as possible. (e.g.: confirmed or suspect agent, known exposure, UXO situation only)
2. Halt all responding personnel at the contamination reduction zone hot line and brief senior responding official of incident before endangering any response personnel by allowing them to enter the area unprepared.

3. Emergency response personnel must minimize the number of personnel entering the contaminated area to effect rescue.
4. UXB personnel will assist emergency response agencies in any way possible to ensure a safe emergency response.
5. UXB personnel will be on stand-by alert to assist emergency response personnel until the conclusion of response action.
6. EA Command Post will maintain continuous operation during incident until conclusion.
7. EA SSHS will maintain a running log of the incident and file a final report on all actions taken.

3.4.1 Blister Agents Mustard (H, HD, HT - Blister Agent)

1. Mustards are oily liquids ranging from colorless to dark brown in color. They have a characteristic odor similar to garlic or horseradish. Mustards freeze at approximately 58 degrees fahrenheit, are stable in storage to 252 degrees fahrenheit, and have no action on metals.
2. Mustards are delayed-acting, persistent, toxic chemical agents that burn and blister the skin or injure the internal parts of the body. Main portals of entry into the body are by inhalation of vapors, by liquid contact with the skin, or through any body opening.
3. Persistence of the hazard from mustard is dependent on the concentration of the agent and the temperature. It will persist two to five times longer in the winter than in the summer.
4. Mustard has a cumulative effect even in small repeated exposures and may produce a sensitization in some

individuals. If this occurs, the individual will exhibit allergic symptoms and will react to even small doses.

5. Symptoms.

- a. Little or no pain occurs upon exposure to mustards. The first symptoms appear 4 to 6 hours later.
- b. Eyes are extremely sensitive to low concentration of mustard and become inflamed, causing "red eye" and a sensation of grit in the eyes.
- c. When exposed to heavy concentrations, the nose and throat become inflamed, causing the sensation of having a head cold.
- d. The skin reddens and water blisters may develop if the individual contacts liquid mustard.

Lewisite (L-Blister Agent)

1. Lewisite is an oily liquid ranging from colorless to violet in color. It has a characteristic odor similar to that of geraniums.
2. Lewisite is a rapid-acting, non-persistent, toxic chemical agent that burns and blisters the skin or injures the internal parts of the body. Main portals of entry into the body are by inhalation of the vapors, by liquid contact with the skin or through any body opening.
3. The persistence of the hazards from Lewisite is dependent on the concentration of the agent and the temperature. It

decomposes rapidly in hot, humid weather.

4. Lewisite has a cumulative effect on the body and acts as systemic poison.
5. Symptoms:
  - a. Lewisite produces an immediately and strong stinging sensation to the skin. Reddening of the skin is evident within thirty (30) minutes.
  - b. Eyes are extremely sensitive to liquid Lewisite and sight loss will occur if they are not decontaminated within one minute.

#### 4.0 PROPOSED SAFETY PROCEDURES FOR MONITORING WELLS

The UXB UXO team will monitor well advancement for Unknown contaminants to ensure that Personnel Protection Equipment levels remain adequate.

U.S. M18A2 Chemical Detector kits will be used to indicate the possible presence of unknown contaminants on or below the surface. The standard operating procedure for investigations using M18A2 Detector kits during confirmation studies is to test for unknowns, this testing will require personal protection levels equal to Modified Level D.

If the M18A2 kit should indicate the presence of a military chemical agent, the site will be surrendered and work will stop for that location.

#### 4.1 PERSONAL PROTECTION EQUIPMENT

If a site is suspected of chemical contaminants and is identified as a potential personnel hazard, personnel conducting site operations will conform to the level of protection as directed by the EA SSHS.

Surface UXO clearance, and/or site UXO EOR teams performing activities within monitoring well locations or suspect UXO surface escort areas will wear OSHA modified level D clothing. This will include hard hat, gloves, coveralls (poly-coated tyvek or equivalent), and disposable boots.

Areas where subsurface activities will be performed will require continuous monitoring of the air by HNU ,OVA or other approved monitoring methods, Example: near the well head or trench excavation operations. Readings will be recorded periodically to determine the amount of vapors released during soil movement activities. These values will be used to assess personnel protection levels.



Upon identification of a chemical contaminant, the health and safety of the personnel in the monitoring location will be re-evaluated; this may allow work to be done at OSHA Level C during soil movement or drilling. Level C PPE includes hard hat, where overhead hazards exist, full face respirator with combination filter cartridges, tyvek (or equivalent), chemical resistant gloves and chemical resistant safety boots. During non-subsurface disturbance activities, Level D will be appropriate.

Workzones will be established by the EA SSHS and are defined in Section 8.1 of the Site Specific Safety and Health Plan.

UXB personnel will conduct a emergency response if loss of life is a danger. Downed personnel requiring decontamination can be decontaminated by UXO emergency safety team. If an emergency develops, UXB UXO Safety personnel or the base emergency rescue personnel, depending on the situation, will conduct a rescue for a downed individual within the EZ.

#### 4.2 MONITORING WELL DRILLING OPERATIONS

Monitoring well drilling at Fort Meade, MD (FMM) will be conducted using standard UXO procedures and safety precautions. Sites at FMM have had explosive, chemical, or incendiary ordnance detonated, burned or buried throughout the years of operation.

During drilling activities, it is possible that UXO'S may be encountered despite pre-drilling UXO inspection surveys. This event could happen during the advancement of the monitoring well. Current surface investigation depths are between 5-6 feet depending on the size of the UXO. Drilling

down past the 6 foot depth mark can not be confirmed clear of UXOs without the re-inspection of the well location from the subsurface depth of 6 feet. The UXO team will convert the ordnance locator to Bore hole mode for detection of ordnance that may be in well pathway. The general approach for clearing monitoring well locations of UXOs required for FMM will be as follows:

#### 5.0 GENERAL FIELD OPERATIONS

Day to day field operations in potentially contaminated areas will follow safety procedures discussed for drilling in to the subsurface as delineated in the Site Specific Safety and Health Plan (SSSHP). In the areas where chemical contamination may be encountered, UXO operations will proceed in the appropriate level of personnel protection, as specified in Section 6 of the SSSHP. Standard operating procedures established for field investigations in UXO-contaminated areas will be implemented during field operations at the locations specified in Section 3.3.5 of the SSSHP.

- a. UXO clearance teams will direct the field teams during access to potential operation sites. UXO clearance teams will determine the safe location for operations based on the approximate location given them by the EA Site Manager.
- b. UXO clearance teams will flag and mark potential unexploded ordnance with the use of surveyor's tape. UXO escort teams will direct field personnel away from known hazard areas. UXO escort teams will be required for any personnel traversing non-cleared UXO areas.
- c. UXO clearance teams will monitor for the presence of unknown chemicals

- d. During installation of monitoring wells, Forester Ferex Ordnance Locator investigations will be conducted at five foot drilling intervals to a depth of 20 feet in order to verify the absence of UXO contamination.
- e. UXO clearance teams will continuously monitor the well head, borings, cuttings and vent gasses during the drilling phase in order to detect unknown chemical contaminants. This monitoring will ensure that the proper level of personnel protection is maintained.
- f. Upon completion of the operation, UXO clearance teams will proceed to the next location and conduct limited brush clearing (if required) and/or flag UXO hazards.
- g. UXO clearance teams will maintain continuous two-way radio communication with the EA command post and senior drilling team member.
- h. UXO clearance teams will be under the direction of the EA Site Safety Health Supervisor during non-UXO clearing operations.

A minimum of Level D protection will be utilized at all times within the exclusion zone determined for each operation, typically defined as an area within 50 feet of an open borehole, excavation, well or sample site location.

#### 5.1 UXO CLEARANCE OF ACCESS ROUTES and SITE LOCATIONS

UXO surface clearance team will clear an access route 15 feet in width from current roads to proposed well location. UXO team will perform Explosive Ordnance Reconnaissance (EOR) procedures during initial entry and conduct a hazard assessment on ordnance items found on the surface.

UXO teams will conduct limited brush clearing necessary for subsurface geophysical investigations. Geophysical investigations will consist of ordnance locator investigations and non ferrous alloy detection.

UXO teams will clear heavy equipment entry routes with ordnance locators to a depth of two (2) feet for equipment access.

Cleared access pathways will be identified by high visibility boundary marker tape.

Proposed well locations will be surface and subsurface cleared for UXO, limited brush clearing if required will be performed. Well location will be cleared to the following radius:

1 Ton Drilling Truck	30 Feet
5 Ton Drilling Truck	45 Feet
10 Ton Drilling Truck	60 Feet

If the results of the UXB geophysical investigation indicate the potential for UXO, the well site will be relocated. Generally, well sites will be moved within the boundary of the existing cleared surface radius.

## 5.2 SUBSURFACE WELL CLEARANCE FOR UXO'S

Well locations during drilling will be geophysically investigated to depth of 20 feet below surface grade with an ordnance locator utilized in the borehole mode for well advancement. Wells will be electronically investigated and certified clear by the UXO team every five (5) feet to ensure well drilling equipment will not encounter unexploded ordnance, canisters of chemical contaminants or metal drums

of buried hazardous waste. Hollow stem augers will be removed from the well hole to allow geophysical investigation in four (4) to five (5)ft increments.

### 5.3 CHEMICAL MONITORING

Historical records review indicate the past use of military chemical warfare agents at selected training areas on Fort George G. Meade. The UXO team in Modified Level D will be required to perform chemical monitoring for "unknowns" at the well head during well advancement to ensure that levels of personnel protection are adequate.

### 5.4 BRUSH CLEARING

In the event mechanical brush clearing should be required (i.e.: Backhoe, Hydro Ax, Brush Hog), steam decontamination of the equipment will be required.

Brush clearing may be done by manual means, ie: saw, ax, weed cutters.

### 6.0 TOOLS AND EQUIPMENT

Equipment, required will be utilized as necessary

- (1) Mask, protective, full face
- (2) Boots, safety, disposable
- (3) Field jacket, cold weather
- (4) Gloves, butyl rubber
- (5) Coveralls, explosive handler (level D)
- (6) Headgear (Hard Hat)
- (7) Wet weather gear

### 6.1 VEHICLES

- (1) Truck 1/2 ton
- (2) Truck, cargo, 2 1/2 ton unit with steam cleaner generator, 275 water gal decontamination supply
- (3) Ambulance stand-by (provided by Kimbrough Army Hospital)

(3) Ambulance stand-by (provided by Kimbrough Army Hospital)

**6.2 GEOPHYSICAL EQUIPMENT**

- (1) Forester Ferex Ordnance Locator
- (2) White Eagle Metal and non ferrous alloy detectors

**6.3 CHEMICAL RESPONSE KIT**

- (1) Gloves
- (2) Boots
- (3) Footwear (Booties)
- (4) Hood
- (5) Mask
- (6) Undergarment
- (7) Gloves, surgical
- (8) Coveralls
- (9) Coveralls, explosive handler
- (10) Apron
- (11) Kit, Detector, M18 A2
- (12) Water, 5 gallon can
- (13) Bucket, 2 gallon, non-galvanized steel or plastic
- (14) Tape, masking, 3-in wide
- (15) Trash bags, plastic, large & small, 6 mil thick
- (16) HTH
- (17) Soda Ash

**6.4 MISCELLANEOUS EQUIPMENT**

- (1) Radio, portable, two-way
- (2) Megaphone
- (3) Air Horn
- (4) Tape, surveyors, plastic, red, blue, yellow
- (5) Stakes (2" x 1" x 4')
- (6) Hammer
- (7) Probes, non-metallic

- (8) EOD Response Kit
- (9) Sand Bags (prefilled)
- (10) Film, Color, 5x7 or 6x4
- (11) Camera, 35mm
- (12) Closed metal containers